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**Sent:** Tuesday, September 25, 2018 9:53 AM  
**To:** Liscio, Matthew P CIV SEA 04, NAVSEA DET RASO [matthew.liscio@navy.mil]  
**CC:** Howard, Leslie A CIV NAVFAC SW [leslie.howard@navy.mil]; Fowler, Janet CIV NAVSEA, SEA 04N [janet.fowler1@navy.mil]; Johnson, Nels [Nels.Johnson@aptim.com]; Schul, Raymond [raymond.schul@aptim.com]; Guillory, Jeffrey [jeffrey.guillory@aptim.com]; Amy Mangel [amy.mangel@aptim.com]; Hanelt, Norm [Norm.Hanelt@aptim.com]; Killpack, Randall [randall.killpack@aptim.com]; Chi, Minhsec [minhsec.chi@aptim.com]; Orman, Sean [sean.orman@aptim.com]; Rogers, Bryon [bryon.rogers@aptim.com]  
**Subject:** [Non-DoD Source] Data package ready for review - HPNS PE-2, RSY B5 (DC)  
**Attachments:** HPNS APTIM RSY B5 (DC) Soil Non-LLRW Concurrence Request 09252018 (reduced).pdf

Mr. Liscio,

APTIM request RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

**LAURA WHITTAKER**  
Radiological Technician 4 (RCT IV)

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## Hunters Point Naval Shipyard, Parcel E-2 RSY Data Report

Contract No. EMAC III CTO-0013					
RSY Pad: B5	RSY Pad Use Number: Deconstruction (DC)	First Submittal <input checked="" type="checkbox"/>	Second Submittal <input type="checkbox"/>		
Data attached and submitted by: Laura Whittaker		Data Report Submittal Date: 09/25/2018			

Soil Sample Data					
Sample Identification	Survey Location	Type of Sample	<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	Total Sr Final Analytical Results (pCi/g)
		Upper limit of site reference background	1.633	0.113	0.331
PE2-RSYB5-DC-S001	1	Systematic	0.695	0.0232	0.0447
PE2-RSYB5-DC-S002	2	Systematic	0.437	-0.0146	N/A
PE2-RSYB5-DC-S003	3	Systematic	0.707	0.0309	N/A
PE2-RSYB5-DC-S004	4	Systematic	0.543	-0.0499	N/A
PE2-RSYB5-DC-S005	5	Systematic	0.585	-0.0439	N/A
PE2-RSYB5-DC-S006	6	Systematic	0.512	-0.00051	N/A
PE2-RSYB5-DC-S007	7	Systematic	0.663	0.0317	N/A
PE2-RSYB5-DC-S008	8	Systematic	0.553	-0.00703	N/A
PE2-RSYB5-DC-S009	9	Systematic	0.66	-0.0485	N/A
PE2-RSYB5-DC-S010	10	Systematic	0.694	-0.0164	N/A
PE2-RSYB5-DC-S011	11	Systematic	0.527	0.00662	0.121
PE2-RSYB5-DC-S012	12	Systematic	0.588	0.0364	N/A
PE2-RSYB5-DC-S013	13	Systematic	0.721	0.0251	N/A
PE2-RSYB5-DC-S014	14	Systematic	0.702	-0.0258	N/A
PE2-RSYB5-DC-S015	15	Systematic	0.648	0.0312	N/A
PE2-RSYB5-DC-S016	16	Systematic	0.659	0.0375	N/A
PE2-RSYB5-DC-S017	17	Systematic	0.673	-0.043	N/A
PE2-RSYB5-DC-S018	18	Systematic	0.507	0.0122	N/A

Sample results shown for <sup>226</sup>Ra and <sup>137</sup>Cs are from the final re-analysis

<sup>226</sup>Ra Radium-226

<sup>137</sup>Cs Cesium-137

Sr Strontium

pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd	Reference Area Static 3σ IL	Reference Area Scan Bkgd	Reference Area Scan 3σ IL	Range
RSI Gamma Walkover Survey	HPRS-08152018-PE2-ROV2-2919	08/15/2018	RS-701/RSX-1	N/A	Console: 7236 Detectors: 5447,5448	N/A	N/A	3,400 CPS	4,872 CPS	3,113-4,608 CPS
RSI Follow-up Static Survey	HPRS-08202018-PE2-JSS2-2930	08/20/2018	RS-701/RSX-1	N/A	Console: 7236 Detectors: 5447,5448	3,612 CPS	4,255 CPS	N/A	N/A	3,758-4,403* CPS
Systematic Sample Survey	HPRS-08142018-PE2-JSS-2921	08/14/2018	2221	06/29/2019	117634	15,069 CPM	17,241 CPM	N/A	N/A	13,861-17,895* CPM

+ Gamma readings exceeding the Reference Area 3σ IL are attributable to the presence of naturally-occurring non-Navy program radionuclides in the excavated soil—see Note(s) in the Summary table (page 2) for more details.

3σ IL Investigation Level (established at 3σ above the mean of the Reference Area dataset)

CPS Counts per second

CPM Counts per minute

Summary
1) RSI gamma walkover survey and data review—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (pages 3-4). Gamma scan coverage is shown on the Systematic Sample Survey map (page 8). Contour maps of scan data are shown on RSI Data Plots (page 5). Data review results are summarized on RSI Review Summary (page 6).
2) RSI Follow-up static survey—48 locations identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations for regions of interest (ROIs) 3, 6, 7, and 8 (VD1). Follow-up locations are shown on the RSI Follow-up Static Survey map (page 7).  <u>Note:</u> Gamma readings reported in the Instrument and Survey Data table (page 1) for the gamma walkover and follow-up static surveys show the mean gamma gross count rate range(ROI 10,VD1) for all surveyed follow-up locations. Count rates in all radionuclide-specific ROIs (3, 6, 7 and 8) were less than the radionuclide-specific Reference Area static ILs for all follow-up investigation locations.
3) Eighteen systematic soil samples (001-018) were obtained and submitted for gamma spectroscopy analysis. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 8). TestAmerica sample results are attached (pages 59-82).  Ten percent of the systematic soil samples (two samples in total, PE2-RSYB5-DC-S001 & PE2-RSYB5-DC-S011) were also analyzed for total strontium. Total Strontium results are also included in the TestAmerica sample results report (pages 59-82).  <u>Note:</u> Static gamma measurements collected at systematic sample locations were obtained with a handheld Ludlum 2221 Scaler/Ratemeter and 3"x3" NaI probe; the results show gamma readings exceeding the instrument-specific Reference Area Static IL at several sample locations. Sample results indicate that this activity is due to the presence of naturally-occurring non-Navy program radionuclides in the excavated soil.  Radium-226 results included in the TestAmerica sample results report (pages 59-82) exceeded the Relative Error Ratio (RER) for sample PE2-RSYB5-DC-S004. A re-analysis of the sample was performed and the results are shown in Systematic Soil Sample Results Report (pages 83-94). The re-analysis results for sample PE2-RSYB5-DC-S004 are within the RER and shown in the soil sample data table.
<b>Conclusions:</b>  <b>All locations with elevated Z-scores identified by the RSI gamma walkover survey were determined to be consistent with background. 48 locations were investigated during the follow-up static survey, with readings less than the Reference Area static IL at all locations for ROIs 3, 6, 7, and 8 (VD1). Spectral analysis results and gamma static data for each region of interest (ROI) are provided (pages 9-56).</b>  <b>Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background. Histograms showing soil sample activity concentrations are provided (pages 57-58). Ten percent of the systematic soil samples (two samples in total, PE2-RSYB5-DC-S001 &amp; PE2-RSYB5-DC-S011) were also analyzed for total strontium, with concentrations less than the Project Action Limit of 0.331 pCi/g, as shown in the Soil Sample Data table (page 1).</b>  <b>This data package characterizes the construction base layer for RSY B5 pad. The soil was initially import clean material.</b>  <b>APTIM request RASO concurrence to release this soil as Non-LLRW.</b> <b>Disposition:</b> This soil shall be dispositioned as non-LLRW waste. The soil will be stockpiled onsite for reuse following appropriate chemical characterization.

## RSI Data Evaluation Process

### RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

Ten ROIs have been established for radium and progeny, cesium, and cobalt, as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (Tl-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	600 - 720	662
8	Pb-214/Ra-226	327 – 399	351
9	Co-60	1085 - 1370	1173/1332
10	Gross Counts	24 – 2811	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. The following review steps are completed to determine if additional follow-up measurements are necessary:

- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 6, 7, 9, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 6, 7, 9, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **All ROIs:**
  - **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ( $Z>3$ ) is marked for follow-up.
  - **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local  $Z>3$  is marked for follow-up.
  - **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local  $Z>3$  is marked for follow-up.
- **ROIs 3, 6, 8, and 10 (radium-specific ROIs):**
  - Z-Scores: The Z-Scores are calculated for each location in the radium-specific ROIs for VDs 1, 3, and 4. Any location with three or more radium-specific ROIs having a  $Z>3$  is marked for follow-up.
  - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in the radium-specific ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a local  $Z>3$  is marked for follow-up.
  - Semi-local Z-Scores: Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise

be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a semi-local  $Z > 3$  is marked for follow-up.

- **ROI 7 (cesium-specific ROI):**
  - Z-Scores: Z-Scores are calculated for each location in ROI 7 for VDs 1, 3, and 4. Any location having a  $Z > 3$  is marked for follow-up.
  - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in ROI 7 for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) having a local  $Z > 3$  is marked for follow-up.
  - Semi-local Z-Scores: Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation in ROI 7 for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) having a semi-local  $Z > 3$  is marked for follow-up.
- **ROI 9 (cobalt-specific ROI):**
  - Z-Scores: Z-Scores are calculated for each location in ROI 9 for VDs 1, 3, and 4. Any location having a  $Z > 3$  is marked for follow-up.
  - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in ROI 9 for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) having a local  $Z > 3$  is marked for follow-up.
  - Semi-local Z-Scores: Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation in ROI 9 for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) having a semi-local  $Z > 3$  is marked for follow-up.
- **Z-Score Time Series Review:** The three types of Z-Scores for ROIs 6, 7, 9, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.

Any location selected for follow-up or with a Z-Score  $> 3$  in a radium-, cesium-, or cobalt-specific ROI will undergo spectral analysis to determine if it is statistically likely that there are ROC concentrations present at that location in quantities greater than background.

A background spectrum is subtracted from the local spectral data for a given location, and the resulting net spectrum is plotted. Critical levels, as defined in Section 6.7.1 of the Multi Agency Radiation Survey and Site Investigation Manual are calculated and plotted based on background levels. The critical level is the level, in counts, at which there is a statistical probability (with a predetermined confidence) of incorrectly identifying a measurement system background value as greater than background. Any response above this level is considered to be greater than background. The critical level is calculated for ROIs 6, 7, 8, and 9 according to the equation shown below:

Where:

$$L_C = 2.33\sqrt{B}$$

LC	=	critical level (counts)
B	=	average background in the ROI

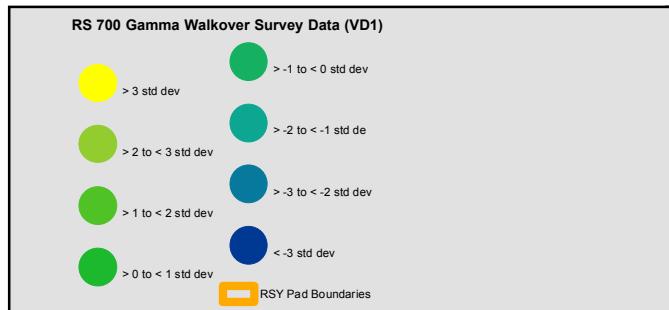
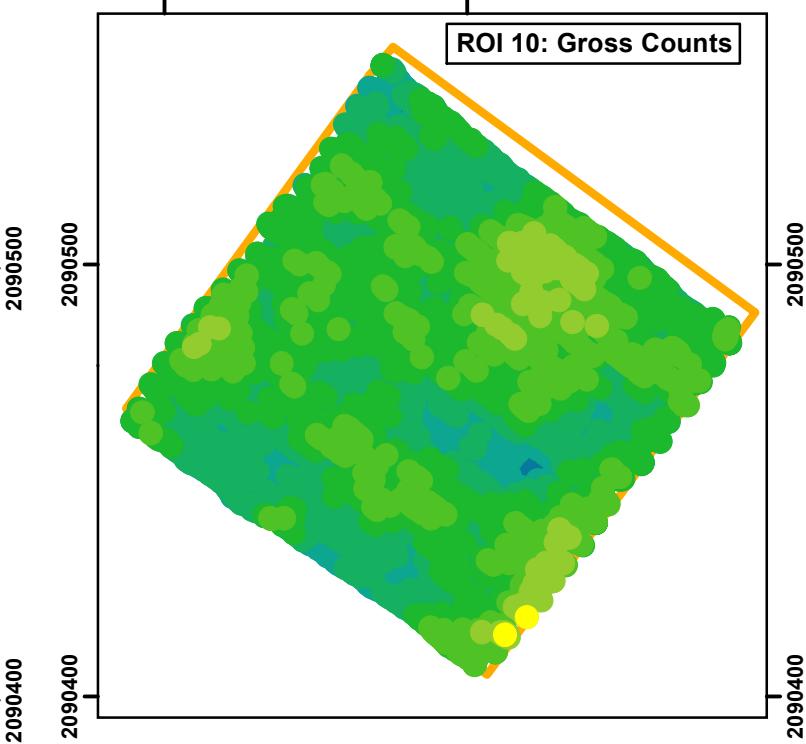
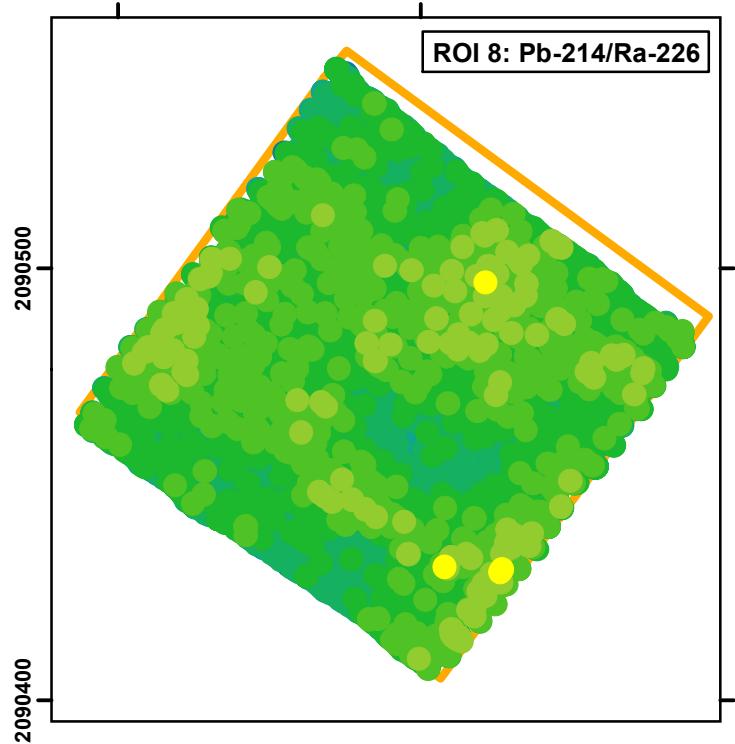
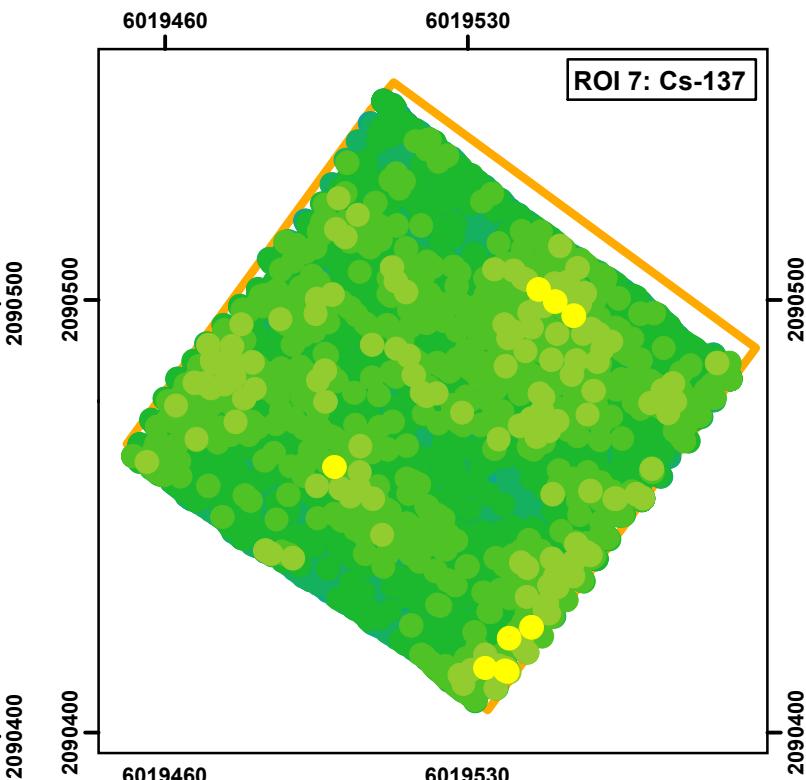
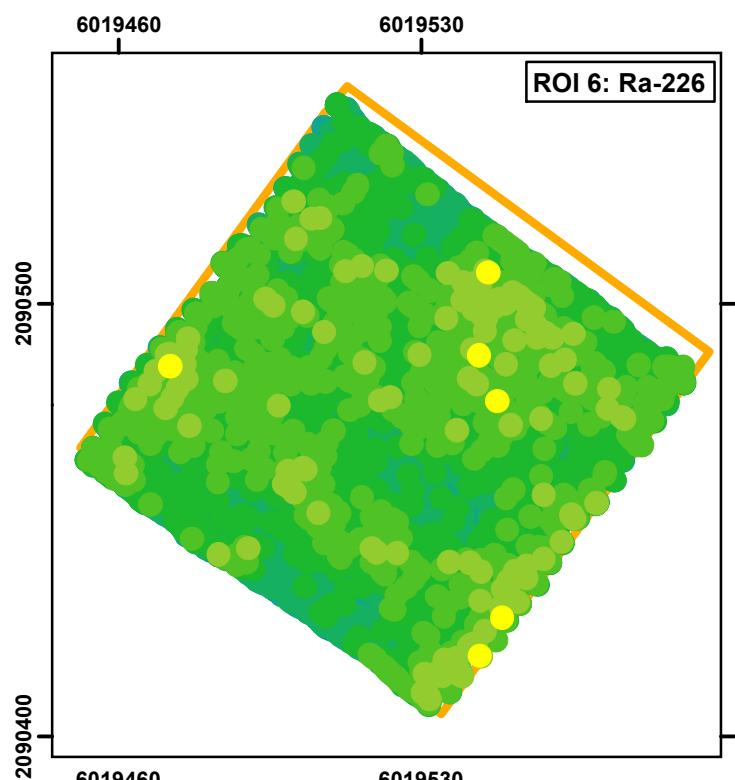
When count rates in the net gamma spectrum at a given location do not exceed critical levels for any radium-, cesium-, or cobalt-specific energy ranges, it is unlikely that ROC concentrations exist at that location above background.

Any data point that is both above the critical level and within the energy range of a given ROI is considered above background for that radionuclide and will be flagged for further investigation in the field.

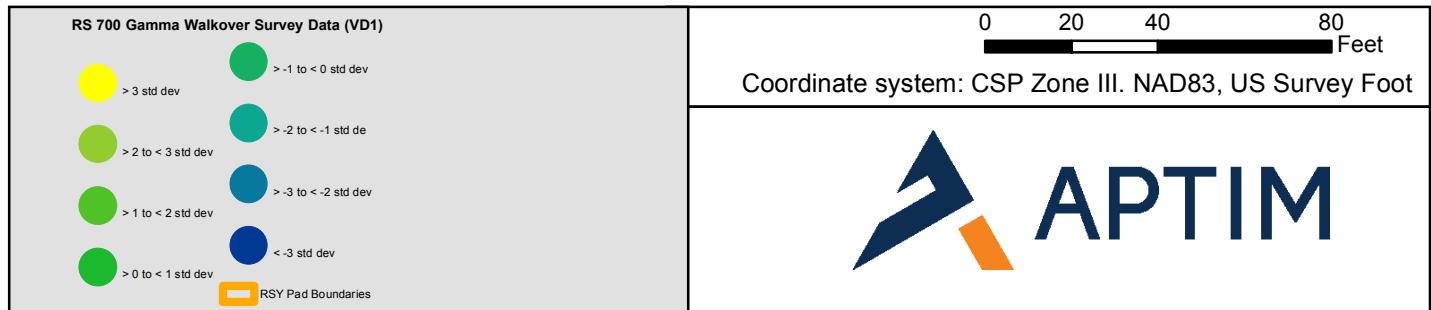
## Contour Map

# HPNS Parcel E-2

## RSY Pad B5 Deconstruction



Coordinate system: CSP Zone III. NAD83, US Survey Foot



## RSI Review Summary

### **Summary:**

48 locations were initially selected for follow-up investigation. Locations were identified by elevated peaks noted in the playback review and/or time series charts, and by using the Z-Score, Local Z-Score, and Semi-Local Z-Score reviews as described in the RSI Data Evaluation Process on pages 3-4. Spectral analyses performed on gamma static data at these locations do not indicate the presence of  $^{226}\text{Ra}$  or  $^{137}\text{Cs}$  above background. Gamma static readings at these locations are less than the Reference Area static IL for ROIs 3, 6, 7, and 8; figures are provided on pages 9-56.

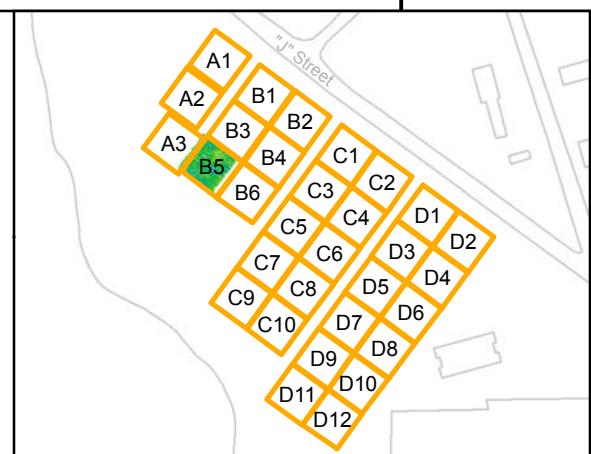
RSI Follow-up Static Survey  
HPRS-08202018-PE2-JSS2-2930

## HPNS Parcel E-2 RSY Pad B5 (DC)

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6019530

6019600

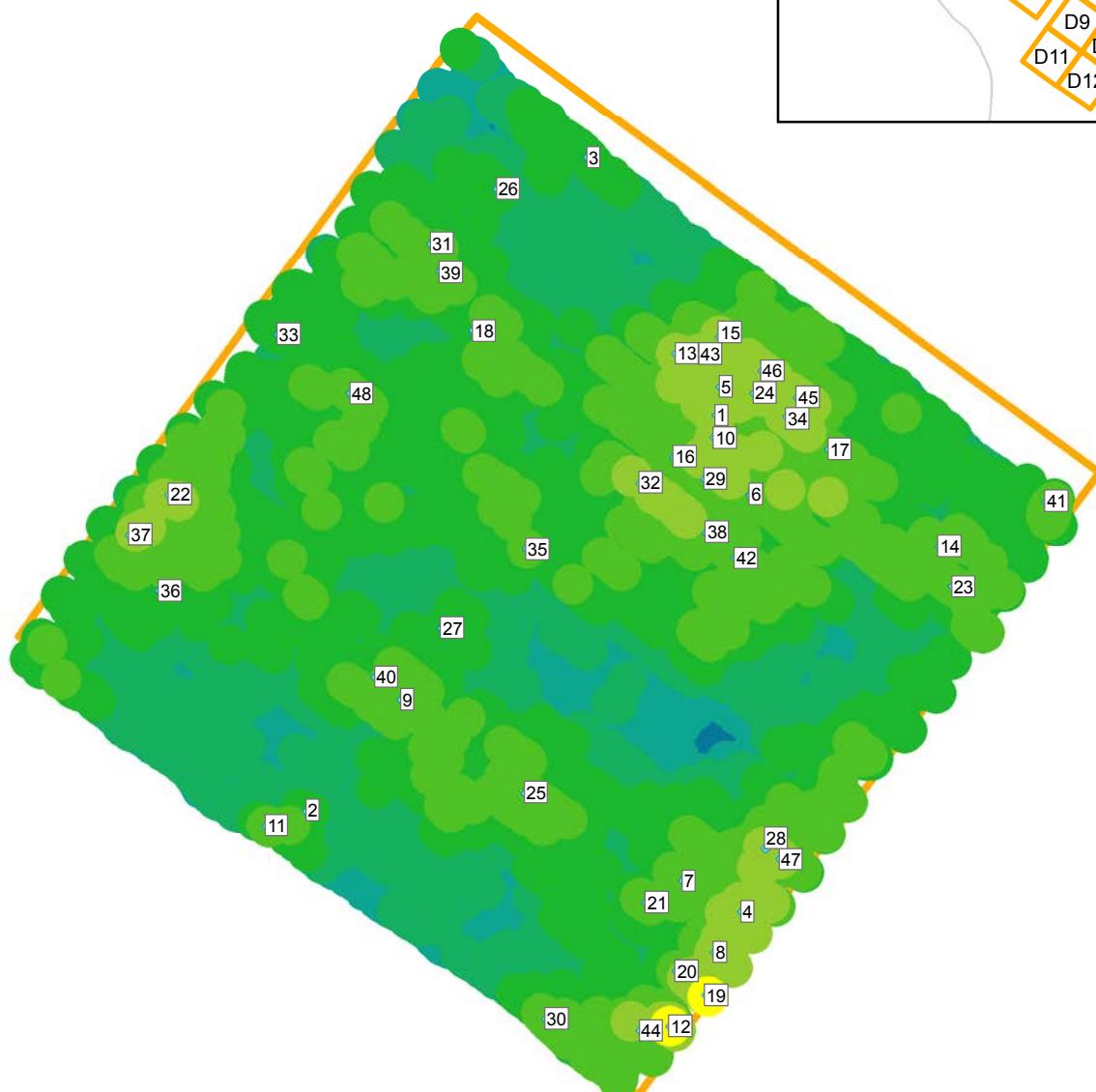


2090500

2090500

2090400

2090400



RS 700 Gamma Walkover Survey Data (VD1, ROI 10)

- ◆ Follow-up Locations
- > -1 to < 0 std dev
- > 3 std dev
- > -2 to < -1 std dev
- > 2 to < 3 std dev
- > -3 to < -2 std dev
- > 1 to < 2 std dev
- < -3 std dev
- > 0 to < 1 std dev
- RSY Pad Boundaries

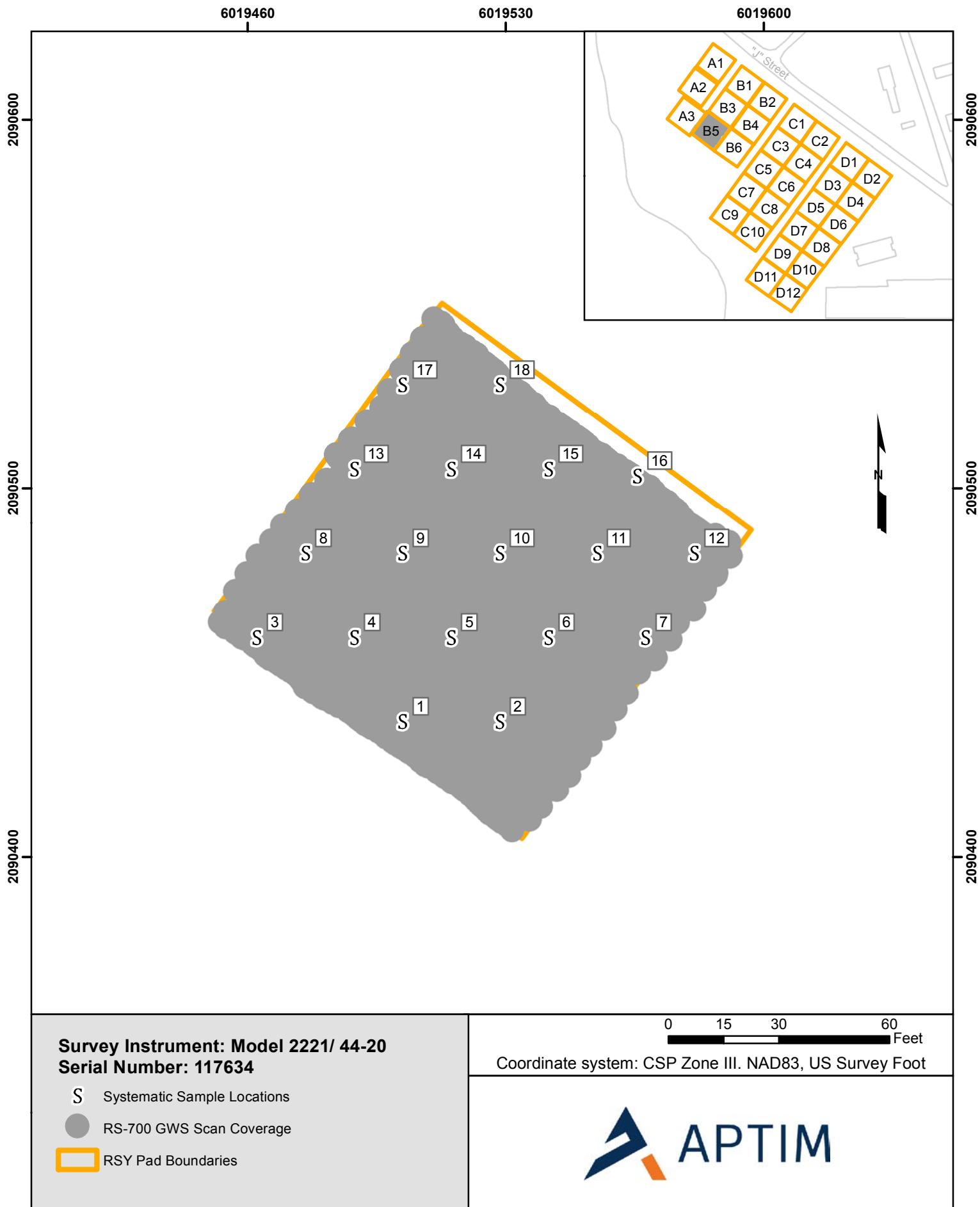
0 10 20 40 Feet

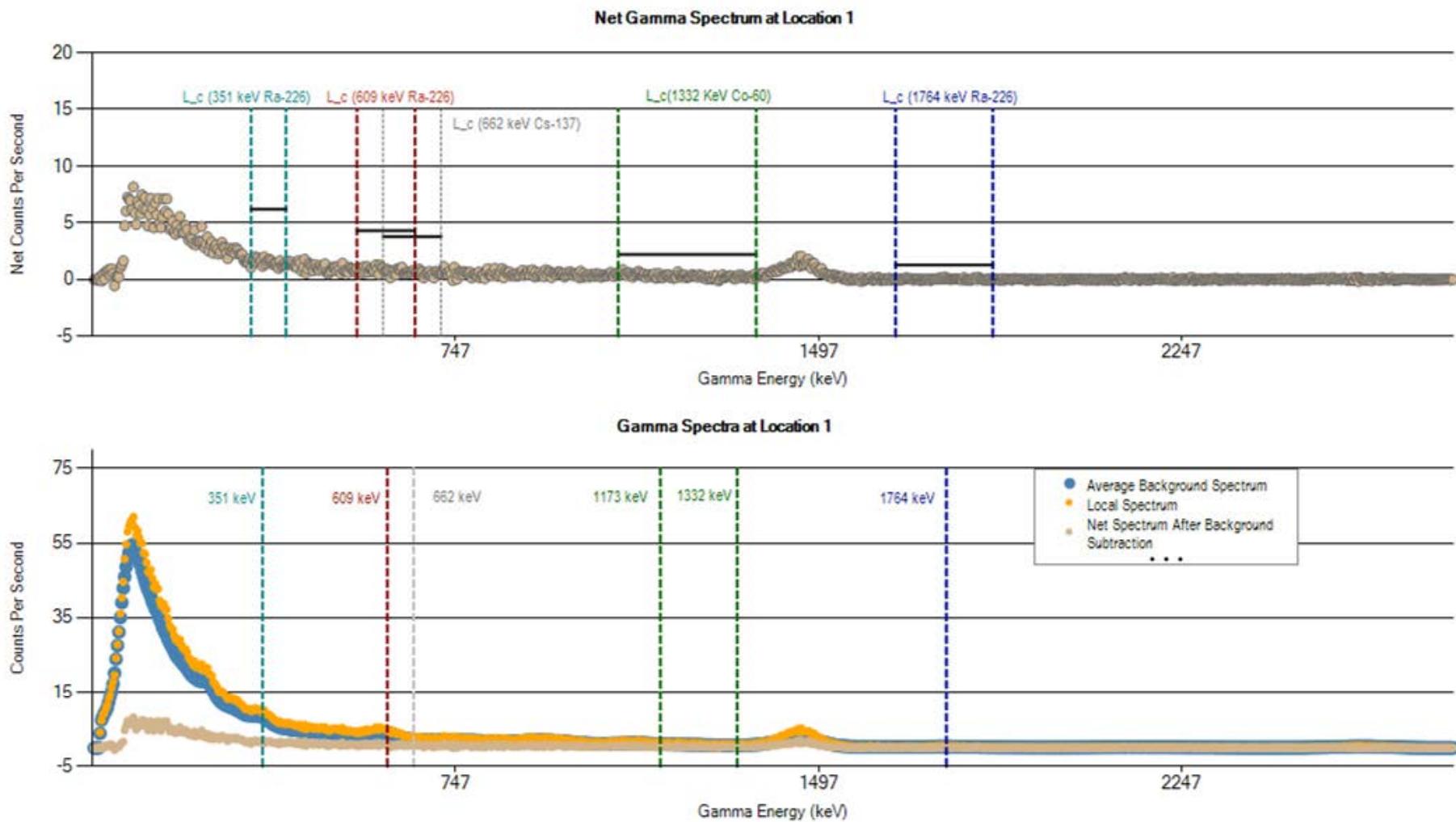
Coordinate system: CSP Zone III, NAD83, US Survey Foot



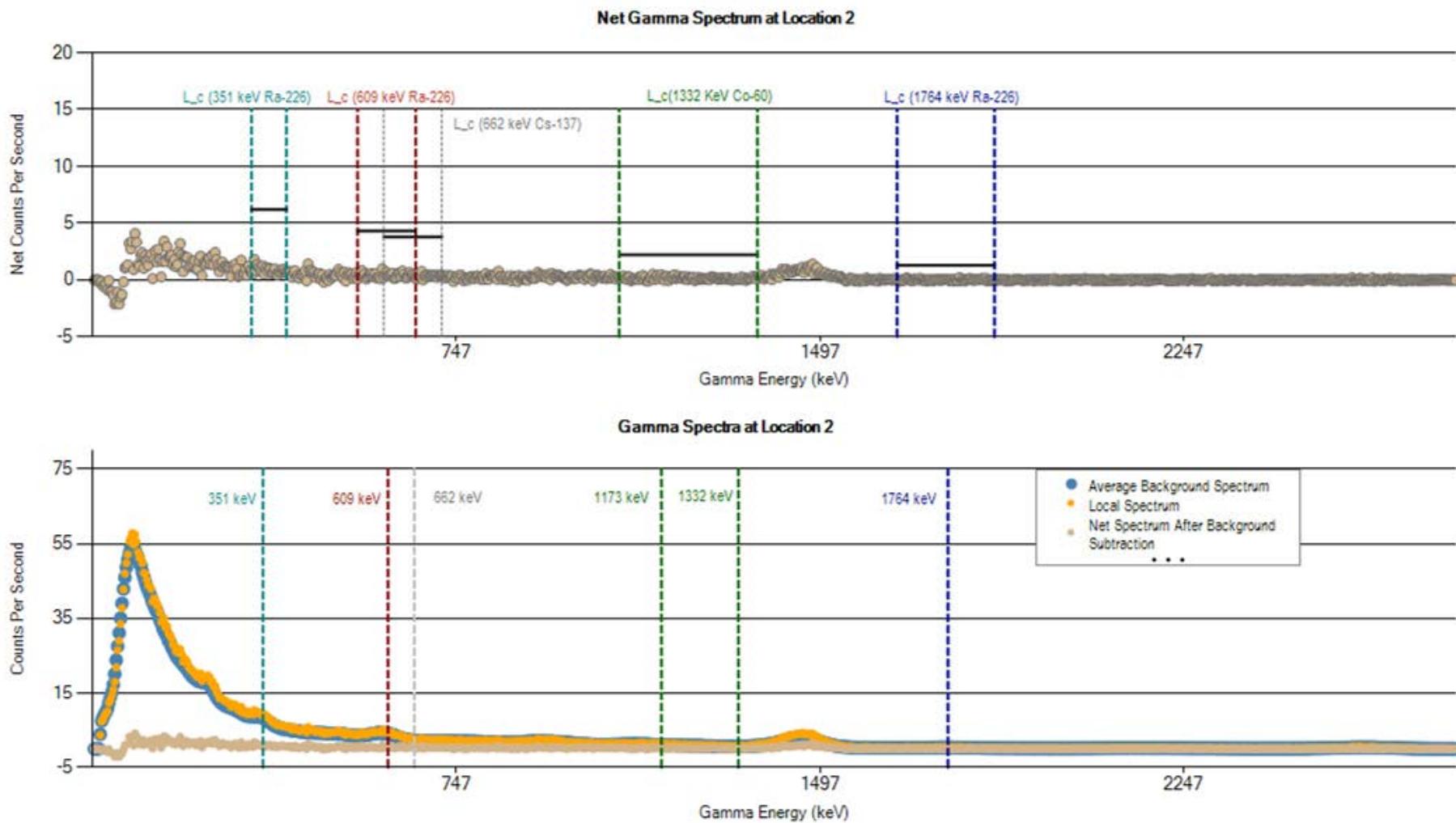
Systematic Sample Survey  
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## HPNS Parcel E-2 RSY Pad B5-DC

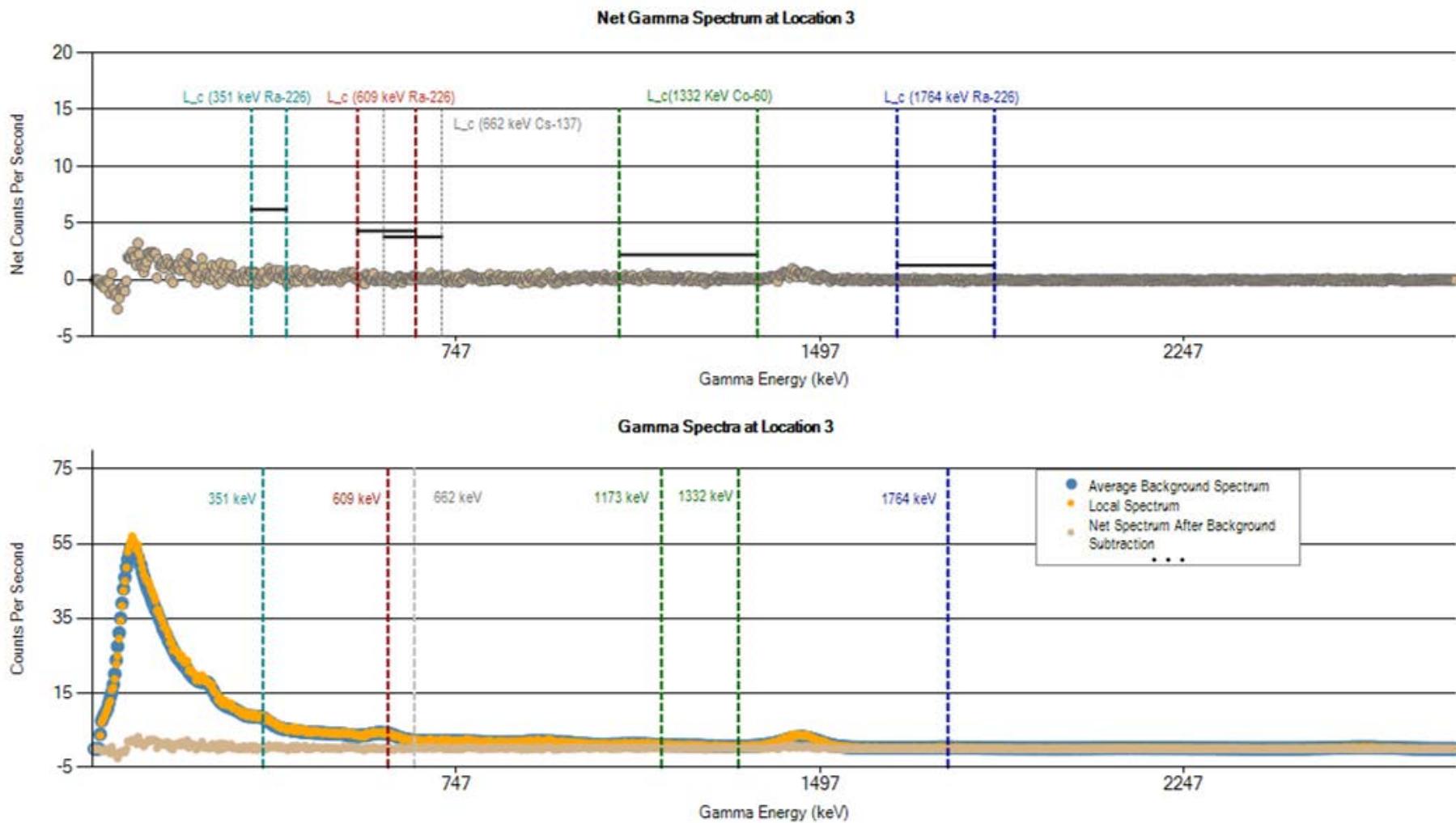




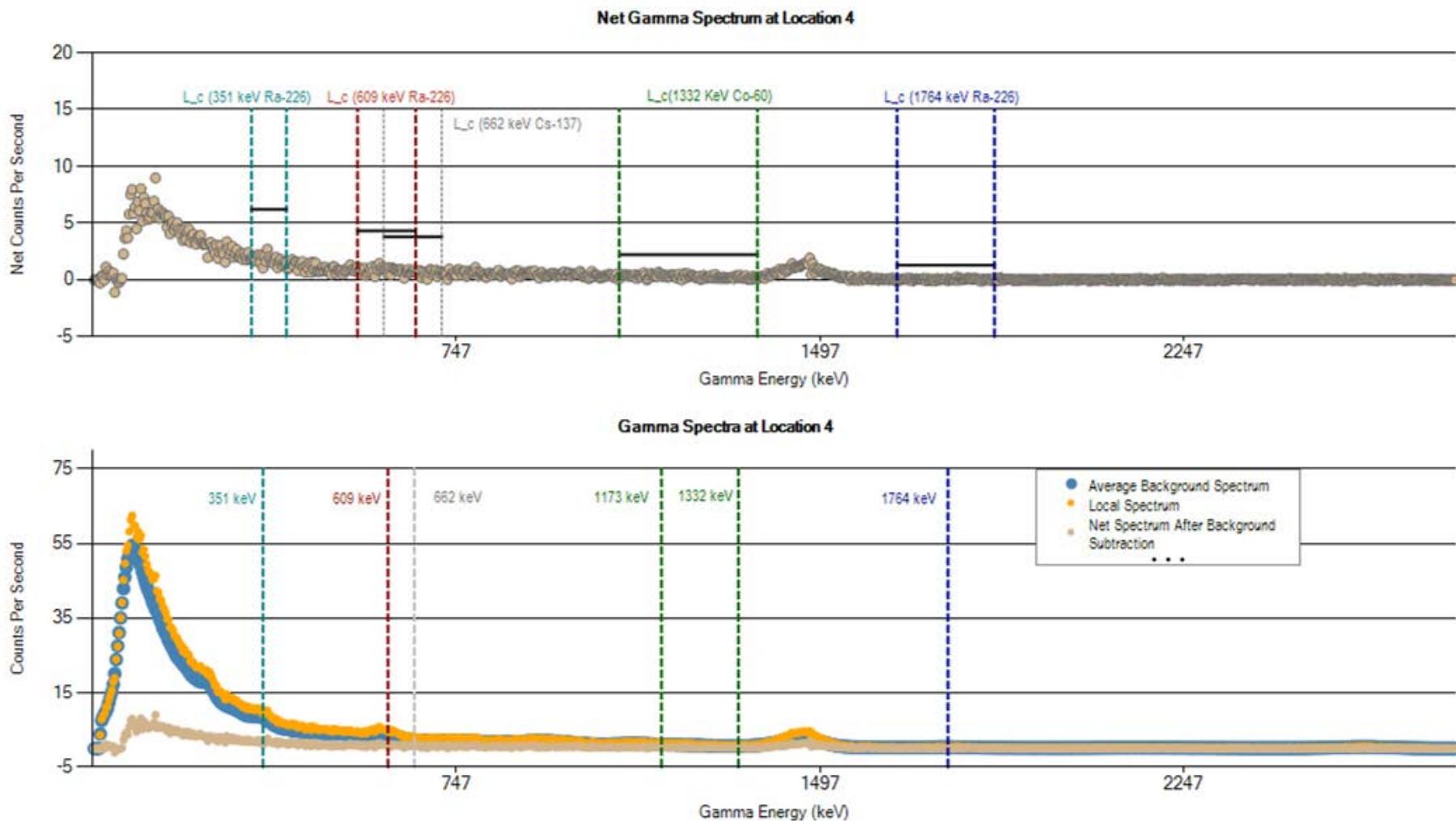
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 1 (cps)	1093	166	23	28	186	172	133	212	118	4274
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



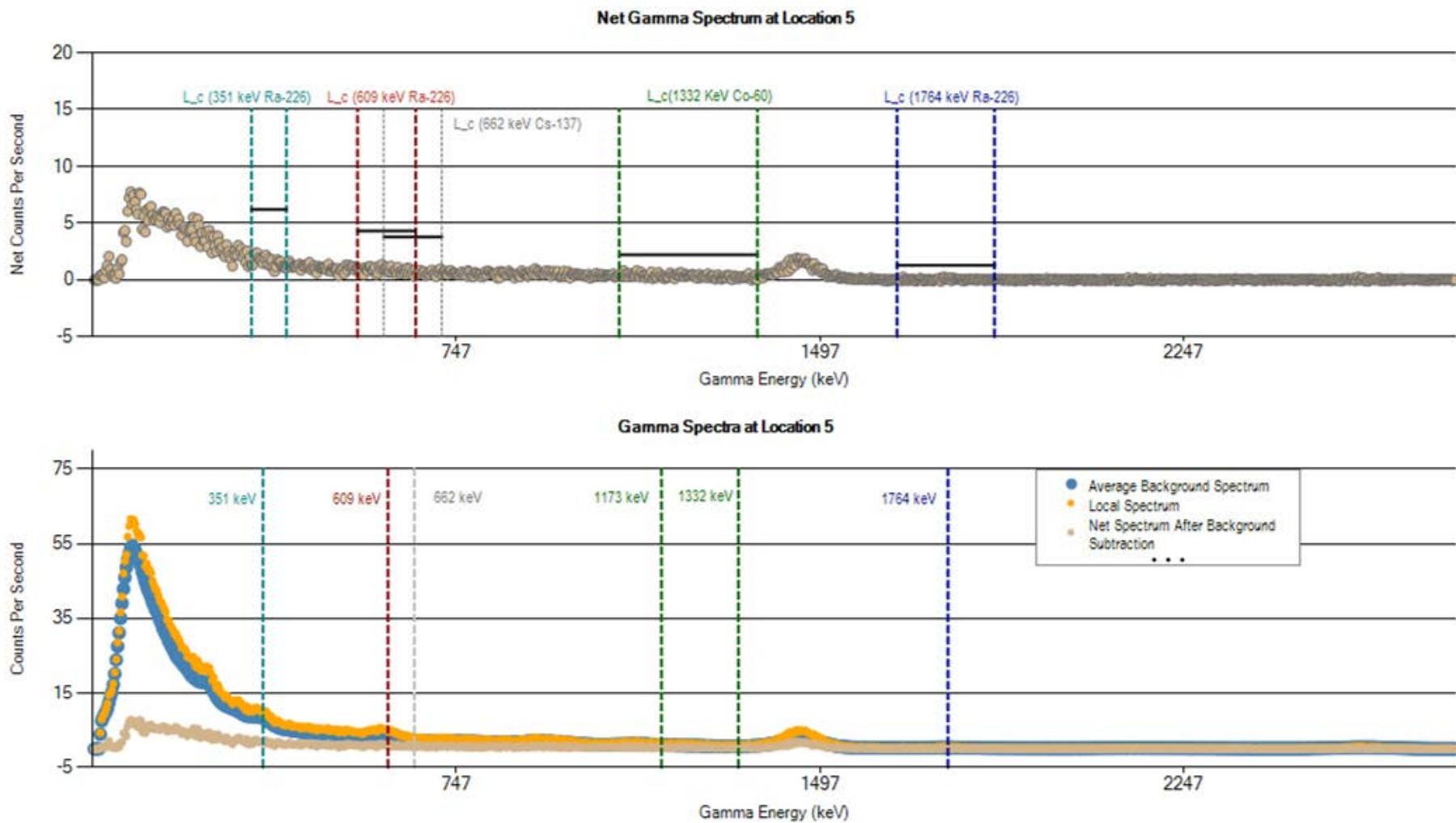
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Location 2 (cps)	980	150	21	25	166	157	123	196	103	3884
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



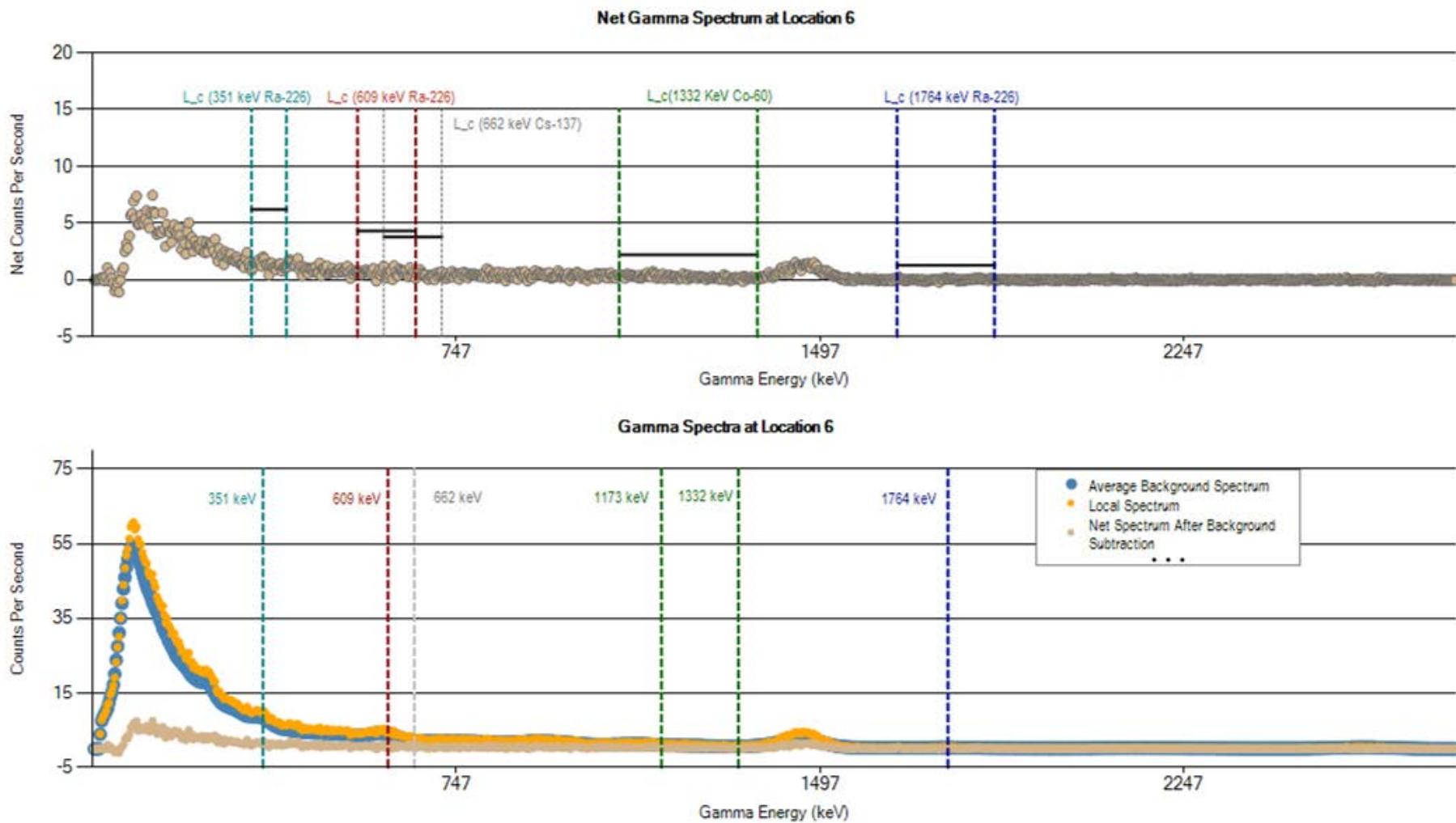
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 3 (cps)	914	132	20	23	159	144	113	183	100	3758
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



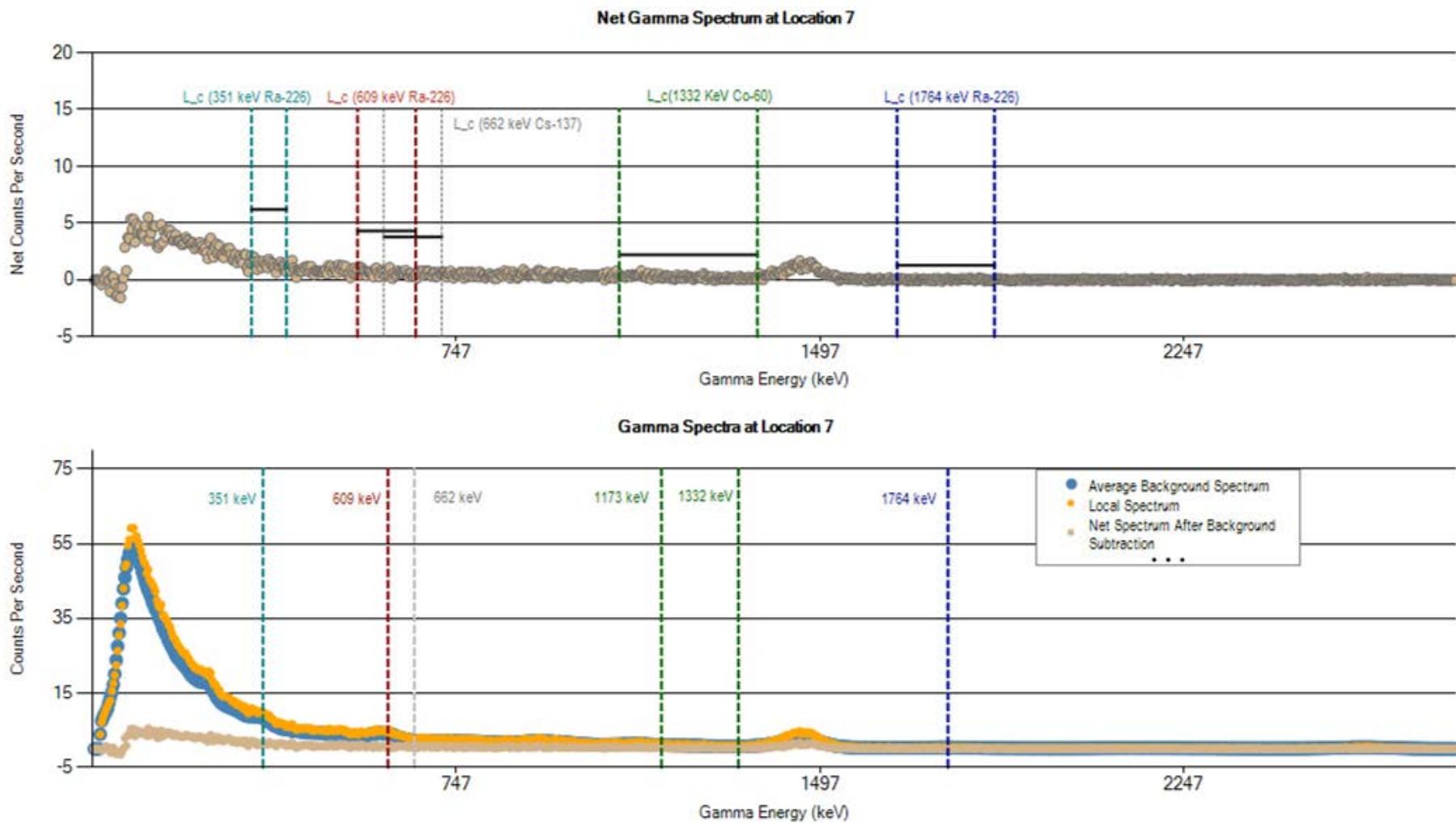
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 4 (cps)	1081	161	23	25	185	173	136	217	115	4252
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



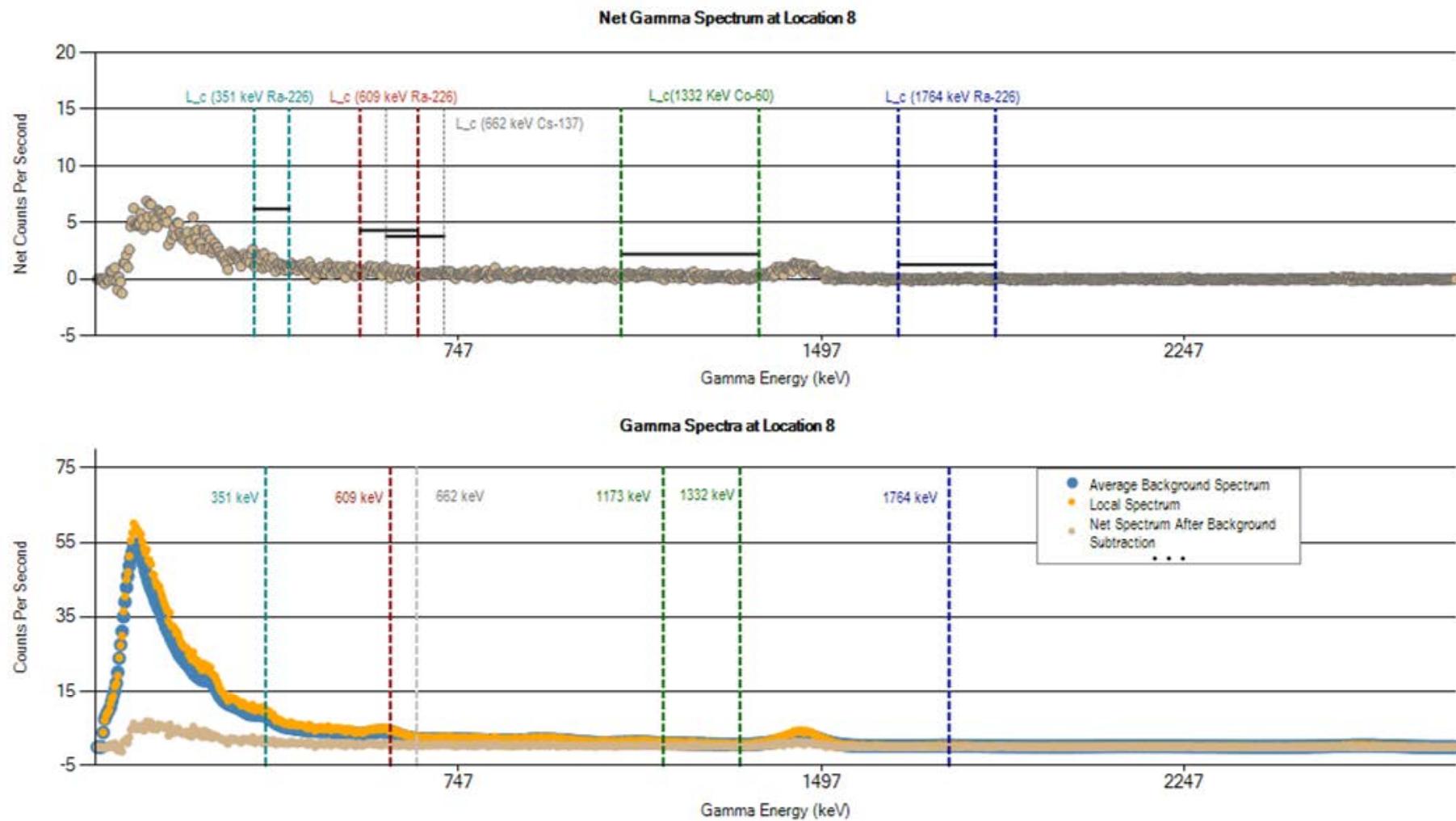
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 5 (cps)	1103	167	23	27	189	174	136	214	120	4296
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



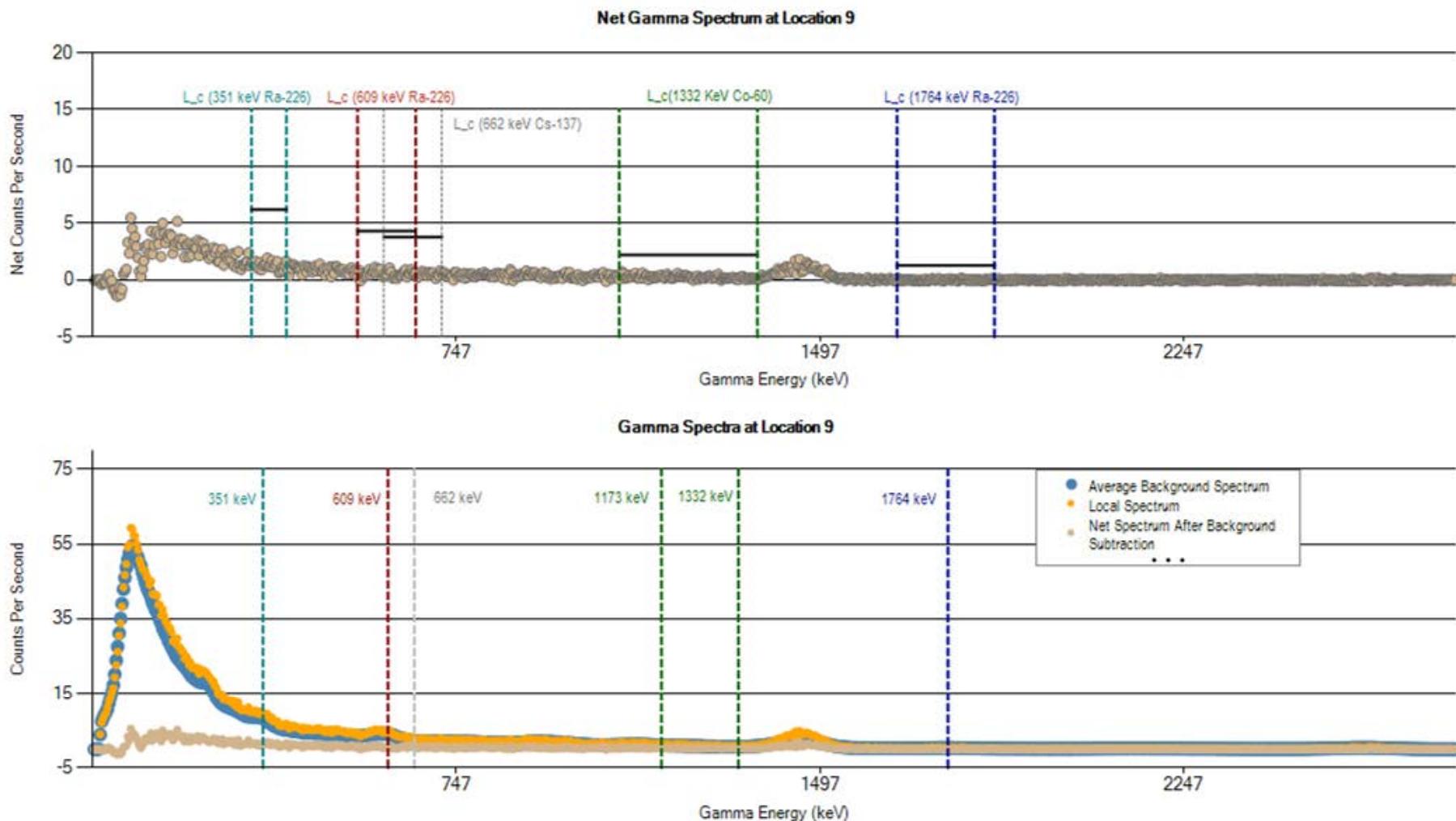
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 6 (cps)	1052	<b>159</b>	23	26	182	165	129	207	113	4155
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



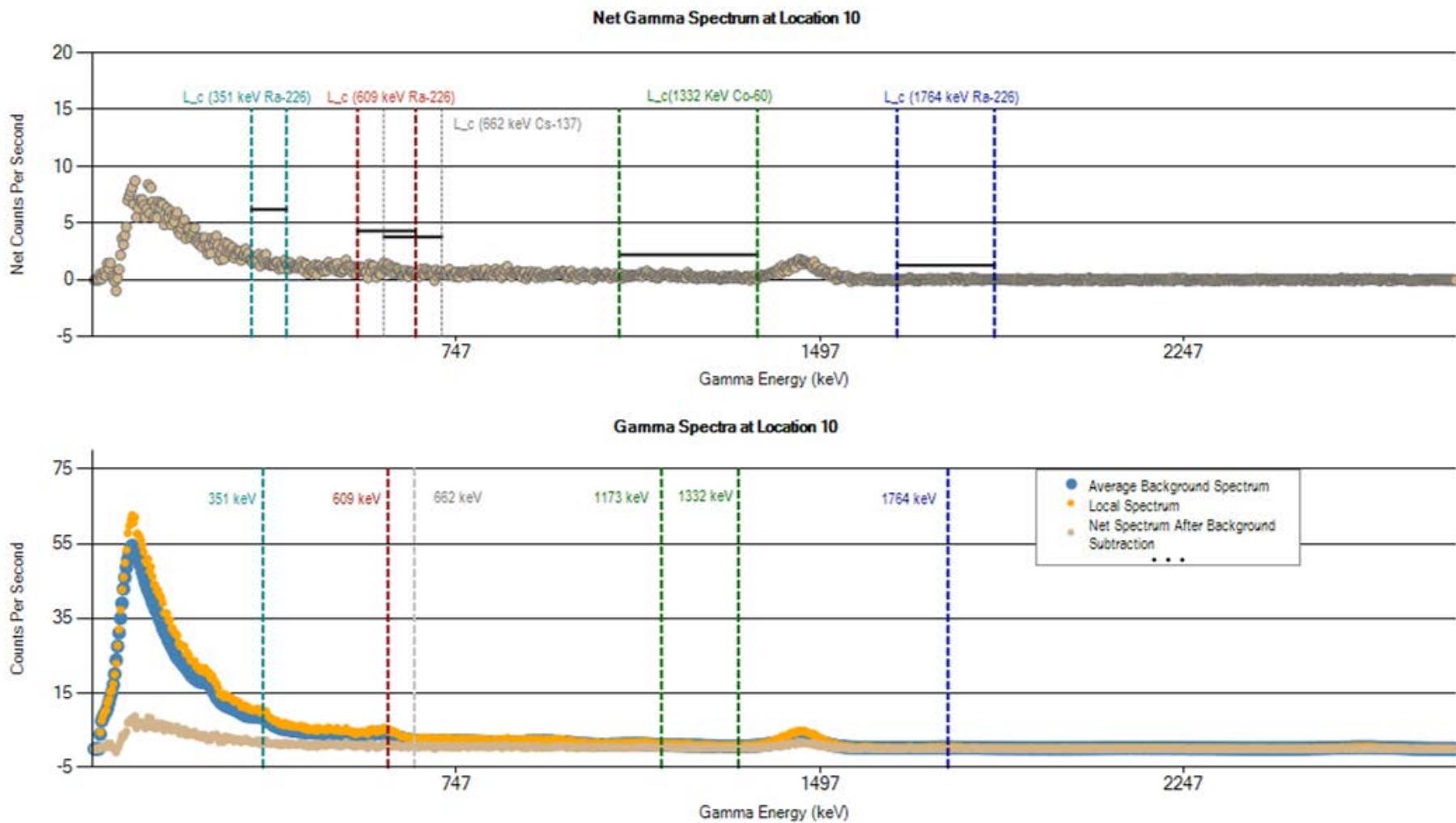
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 7 (cps)	1054	159	23	26	183	165	130	208	112	4122
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



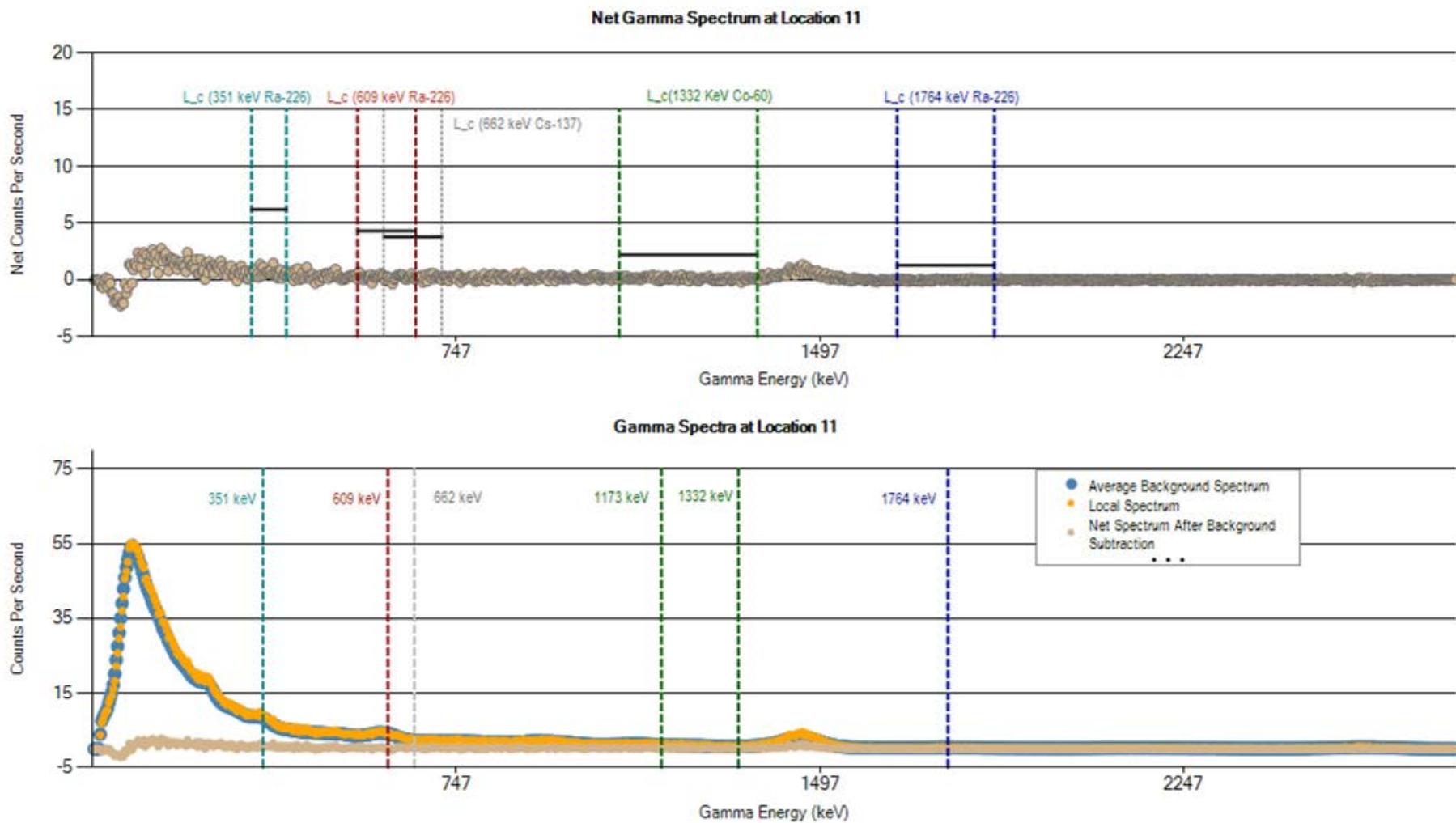
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 8 (cps)	1046	<b>154</b>	22	25	181	166	128	208	115	4165
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



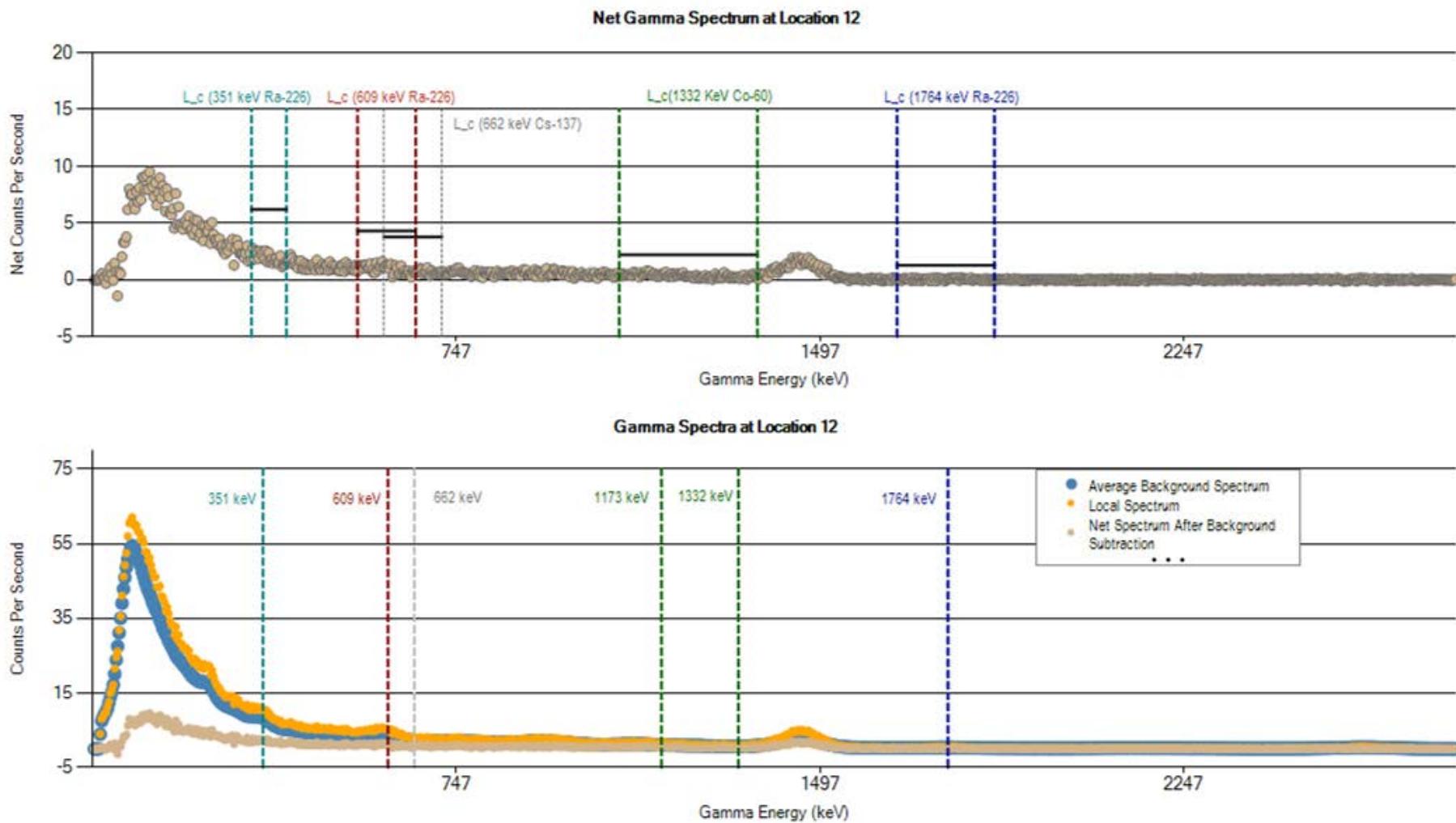
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 9 (cps)	1047	<b>157</b>	22	25	181	164	129	206	114	4062
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



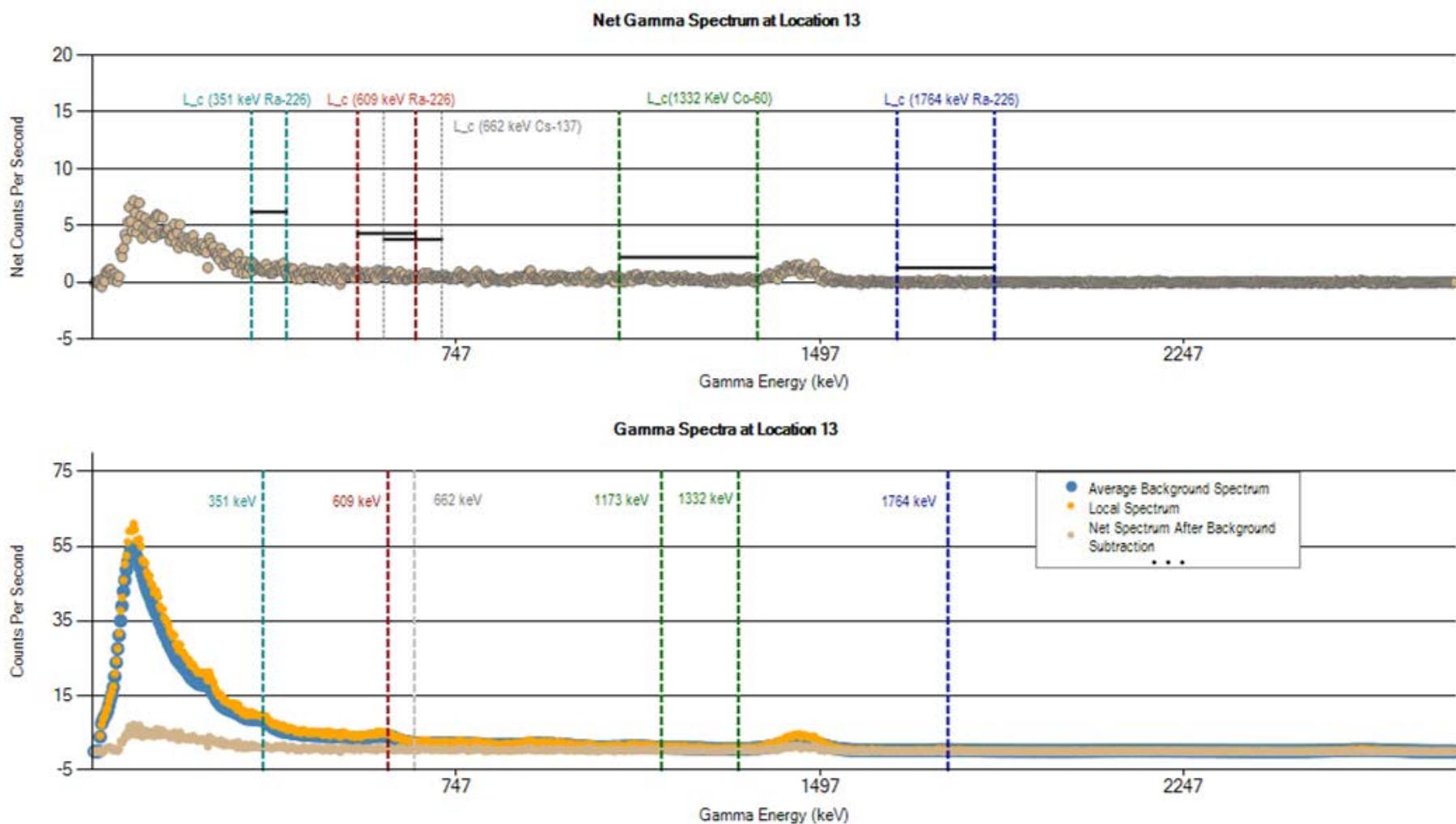
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 10 (cps)	1097	167	23	26	190	173	135	213	118	4303
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



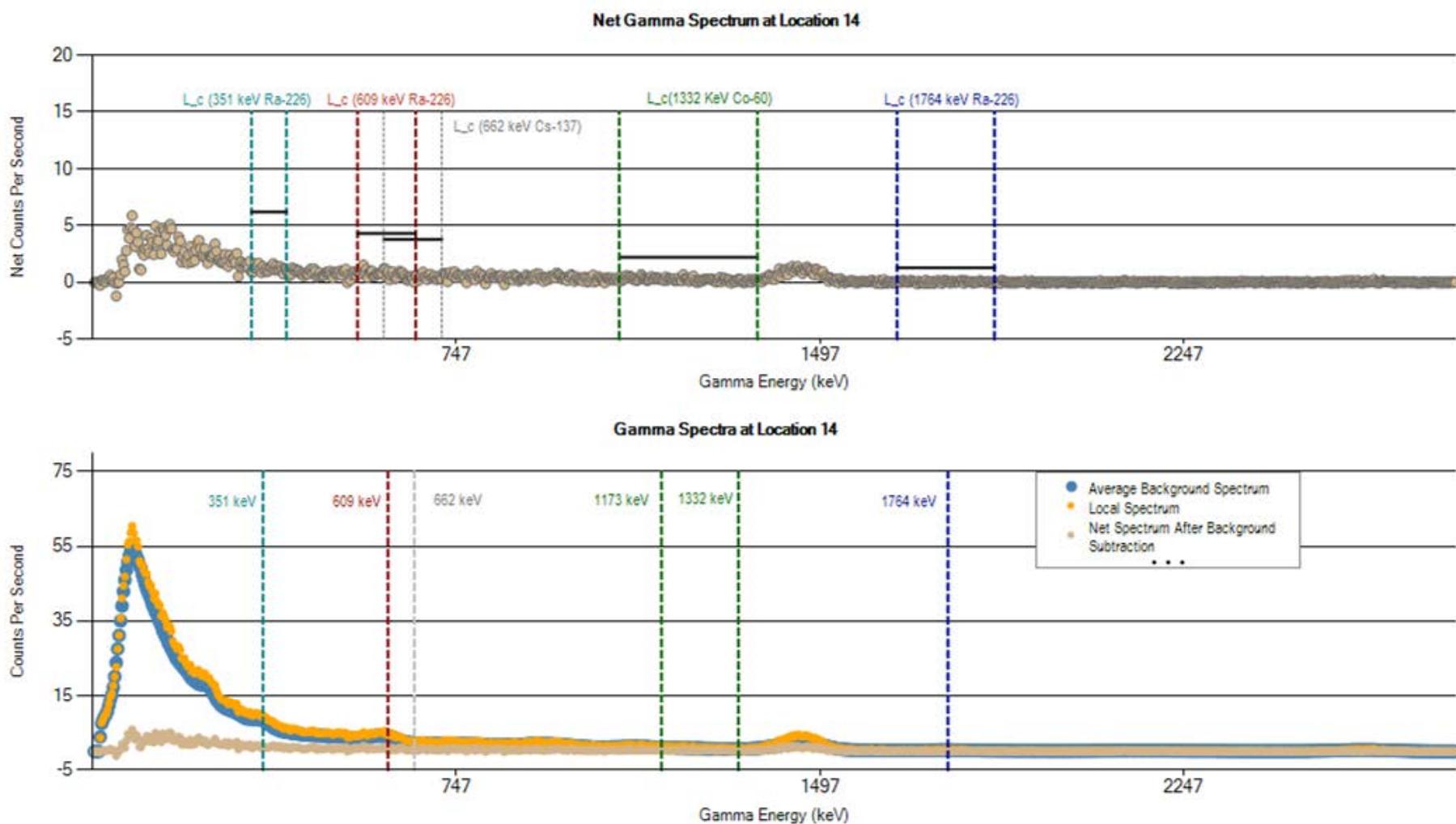
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 11 (cps)	947	143	20	24	163	150	117	189	101	3807
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



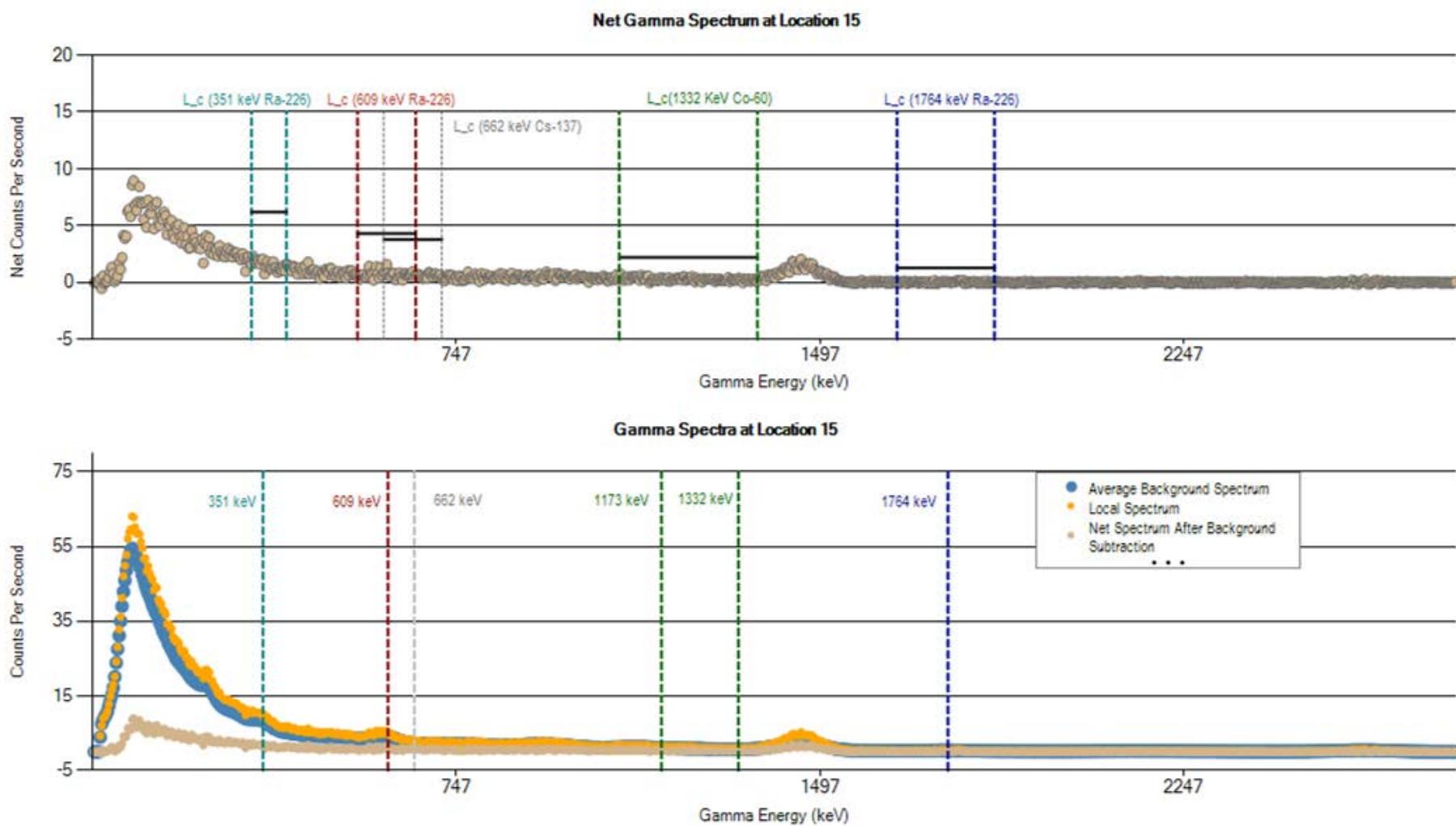
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 12 (cps)	1129	172	24	27	195	179	138	222	123	4403
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



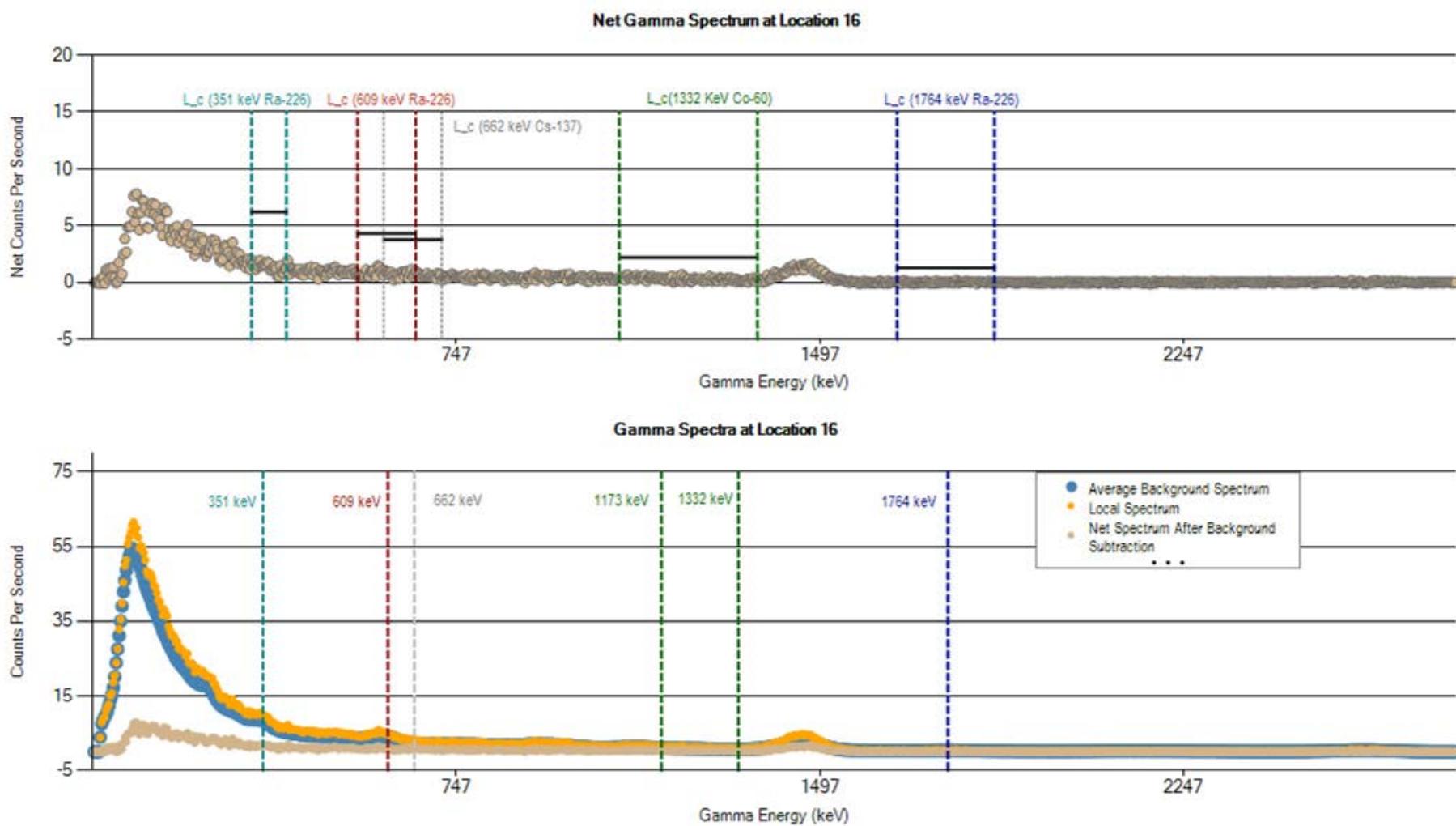
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 13 (cps)	1043	<b>159</b>	22	25	177	165	129	202	115	4160
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



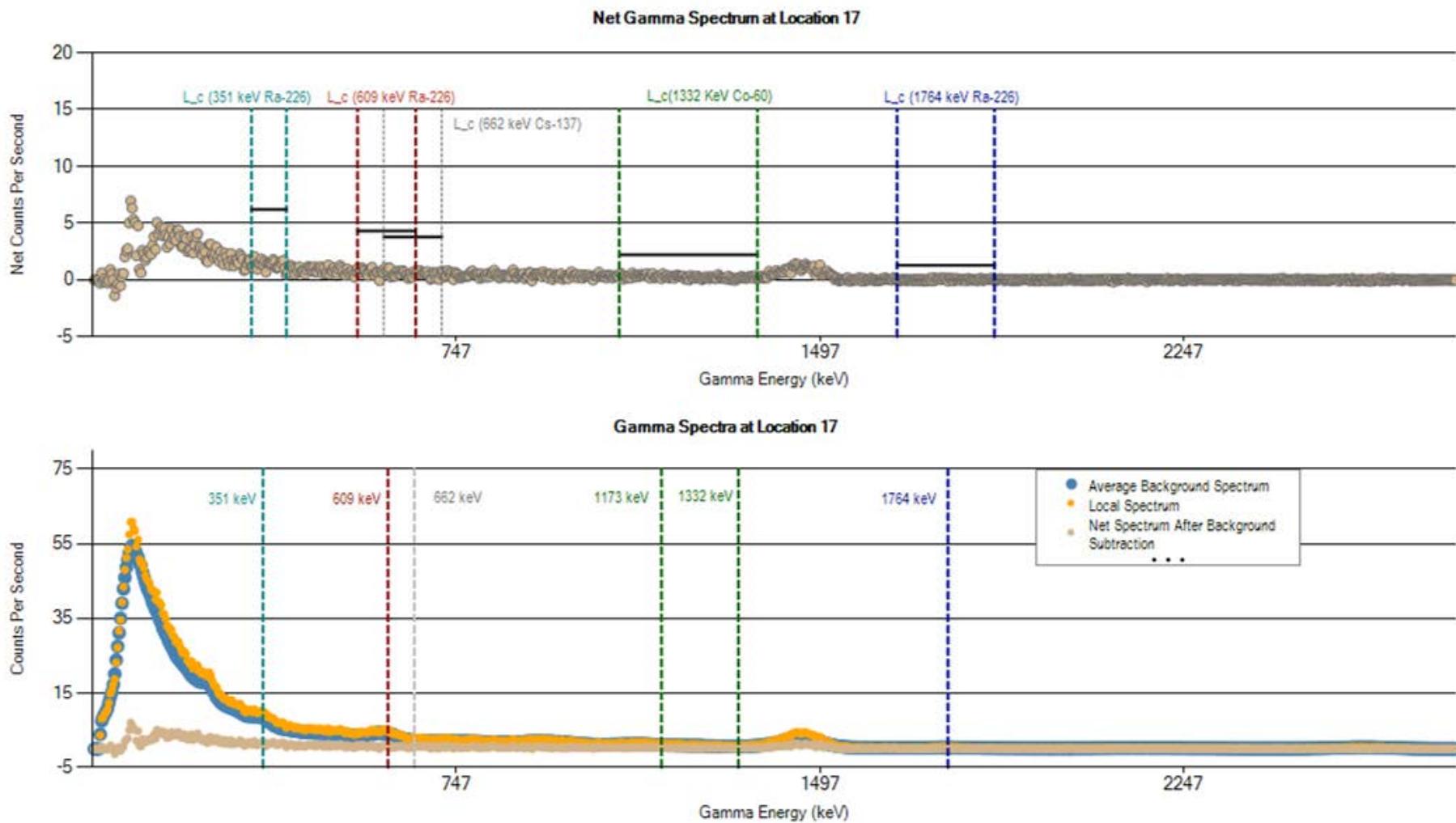
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 14 (cps)	1059	156	24	27	183	170	129	205	114	4095
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



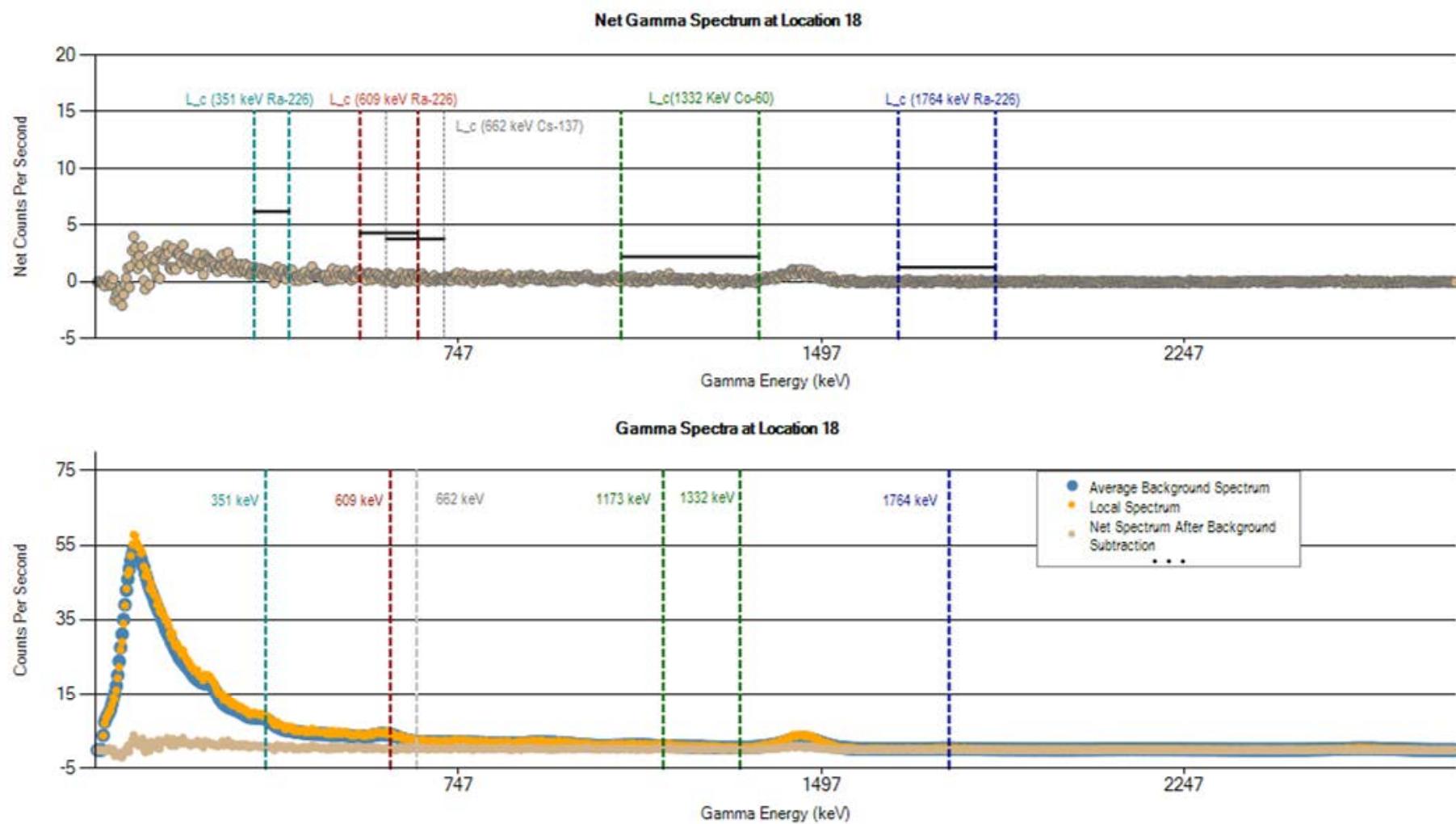
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 15 (cps)	1081	167	23	26	182	170	133	212	117	4265
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



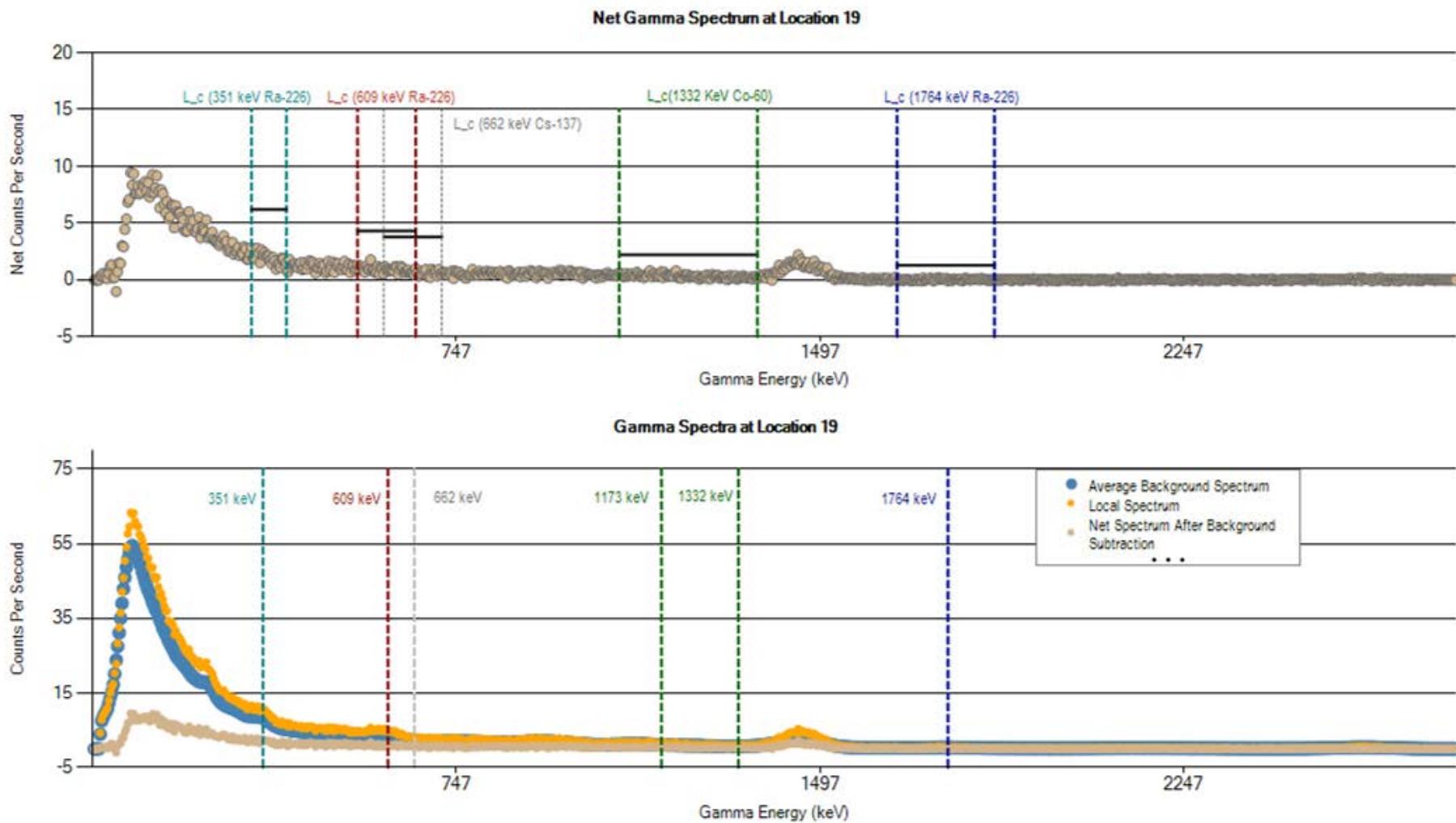
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 16 (cps)	1078	163	22	28	186	172	135	209	118	4237
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



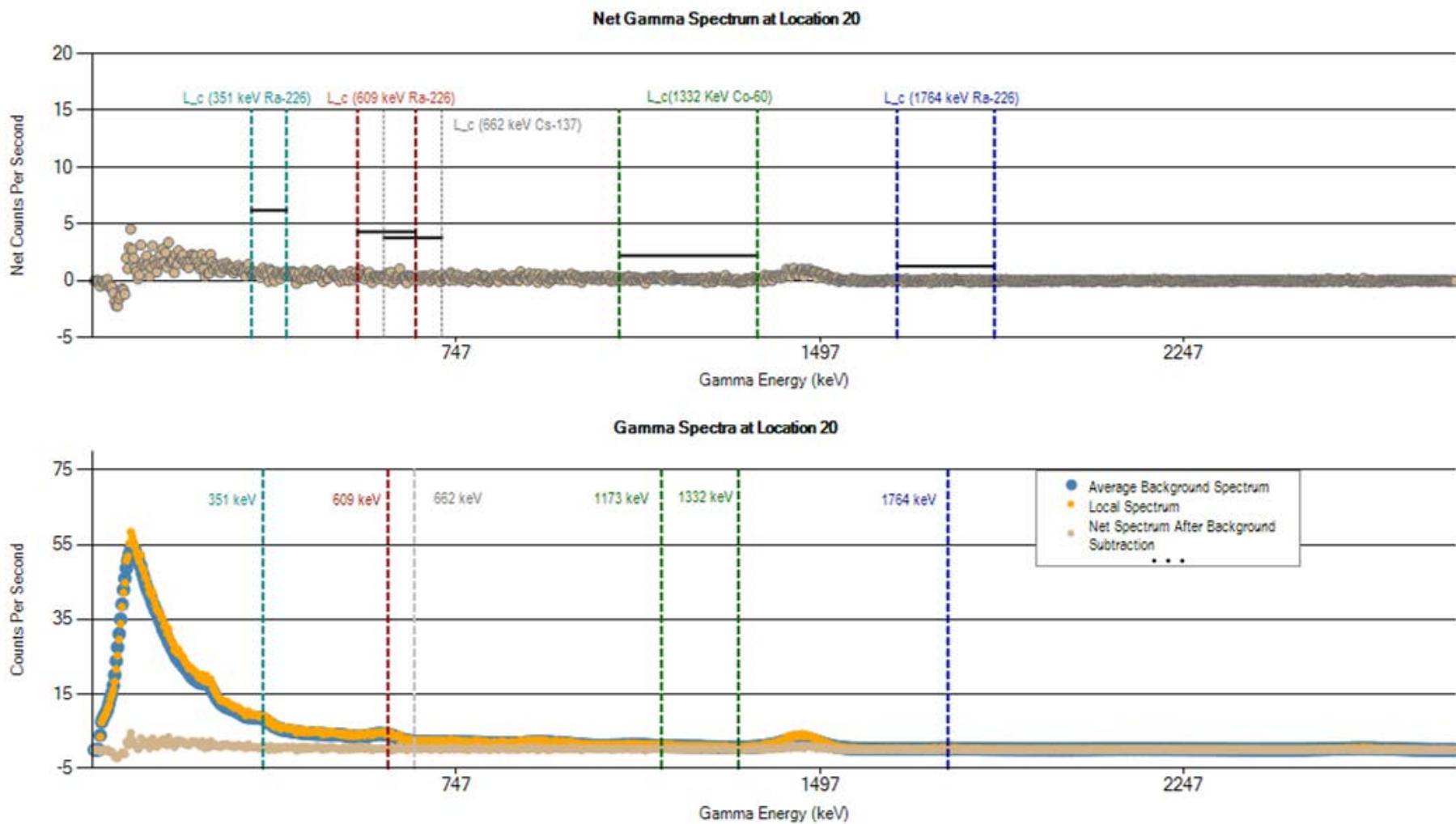
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 17 (cps)	1044	<b>155</b>	22	25	182	166	130	208	113	4087
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



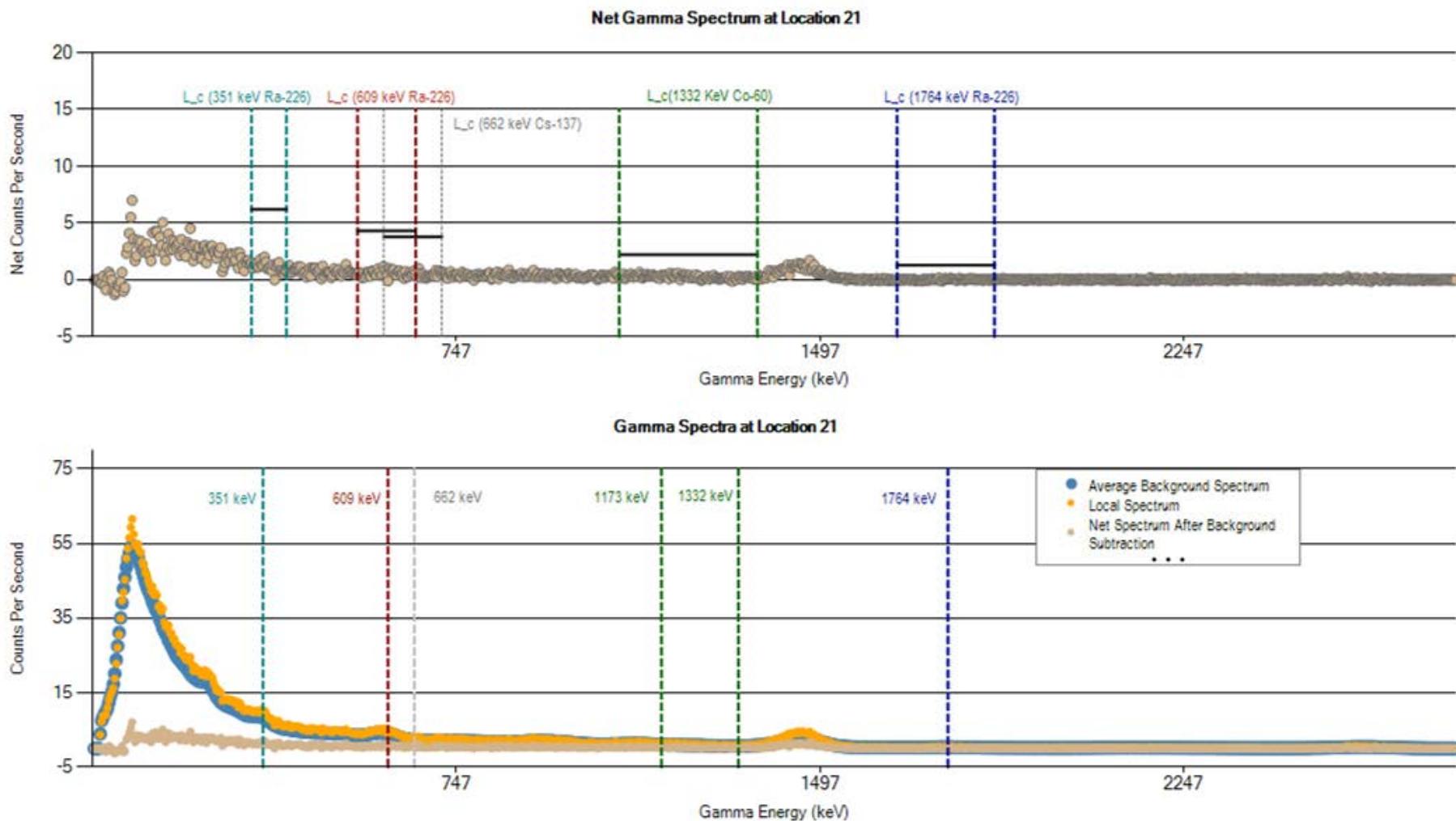
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 18 (cps)	985	144	22	25	172	157	121	194	105	3897
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



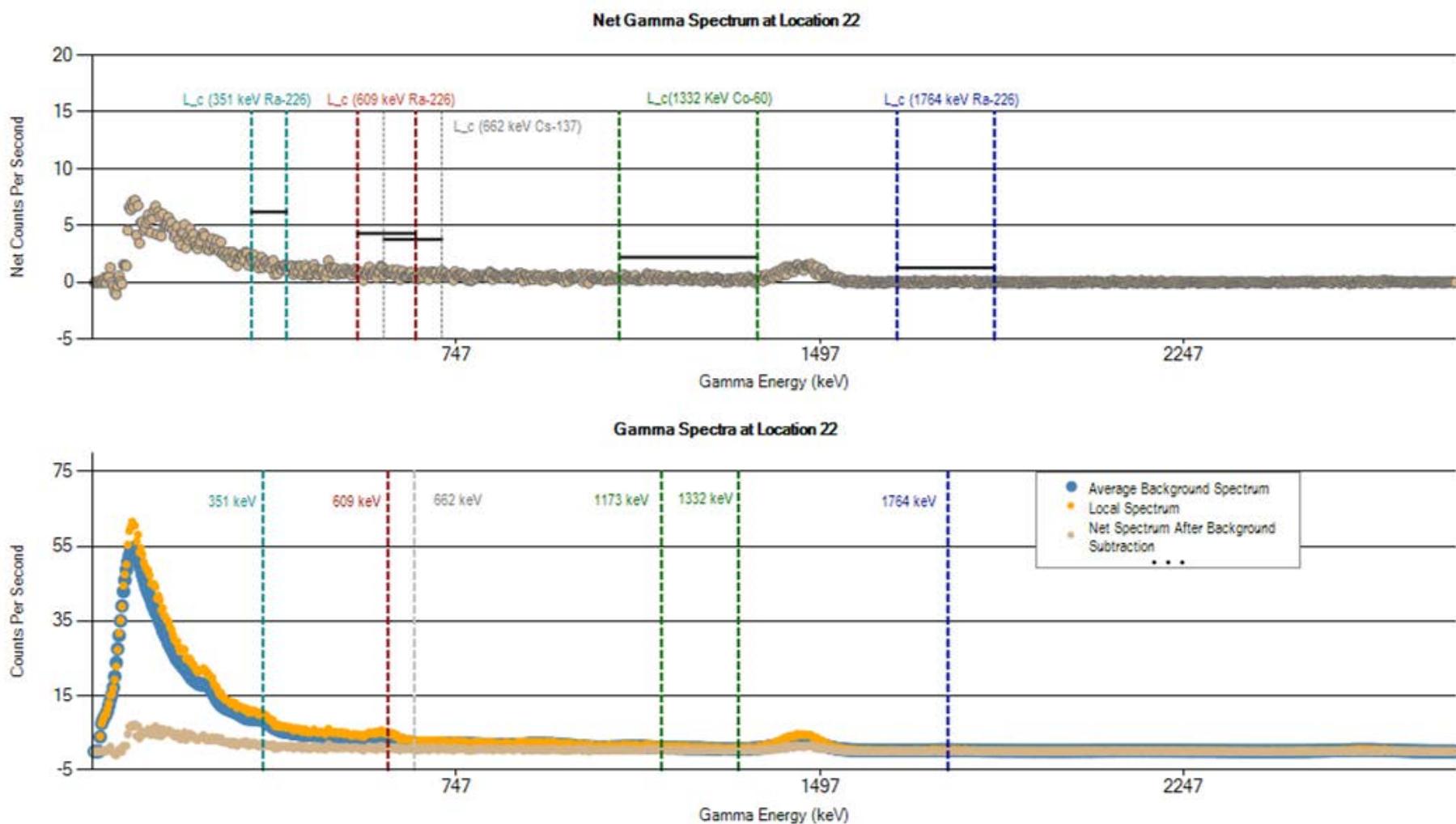
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 19 (cps)	1113	167	23	28	195	176	137	219	120	4393
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



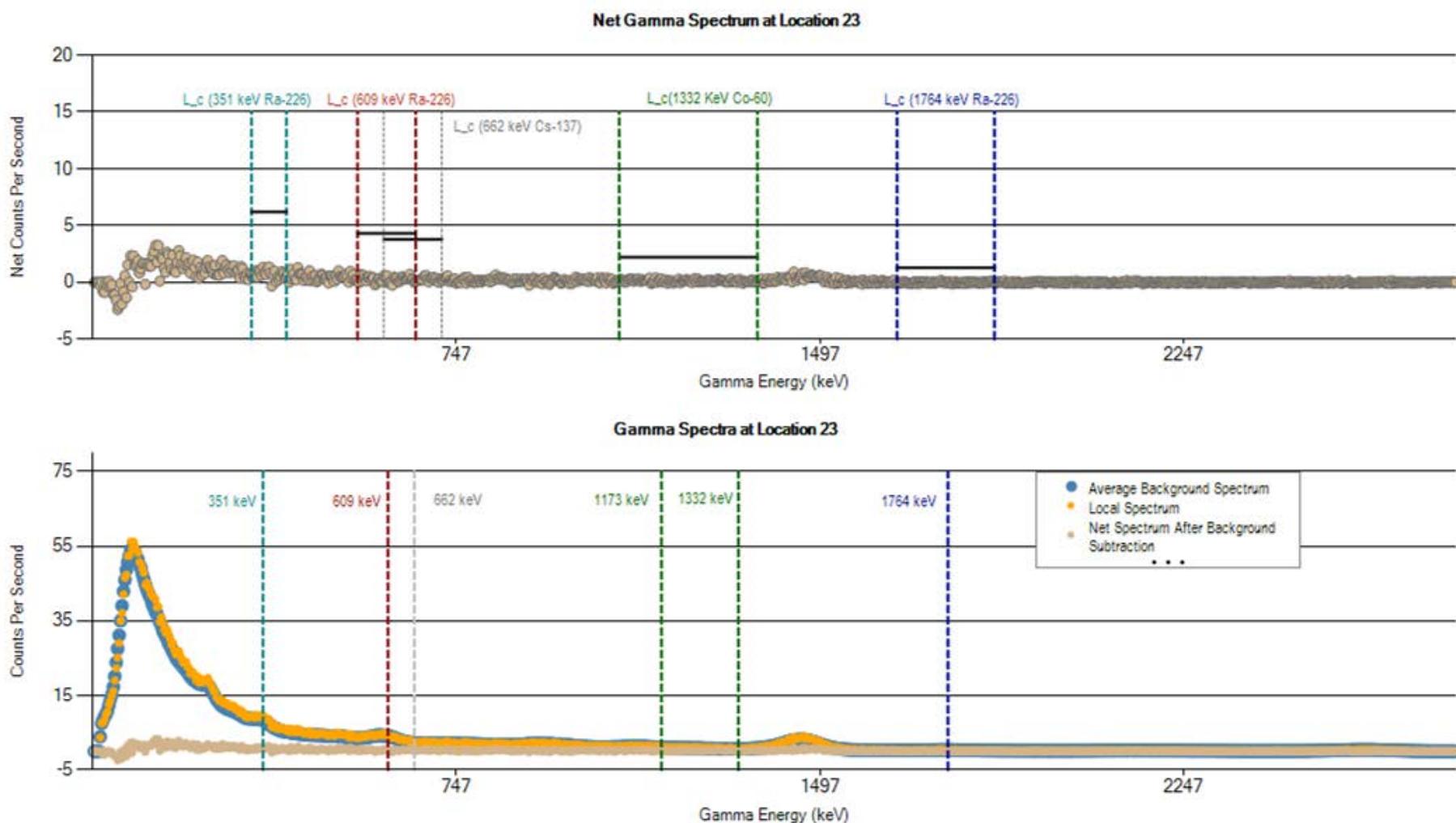
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 20 (cps)	971	143	21	25	169	155	120	189	103	3862
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



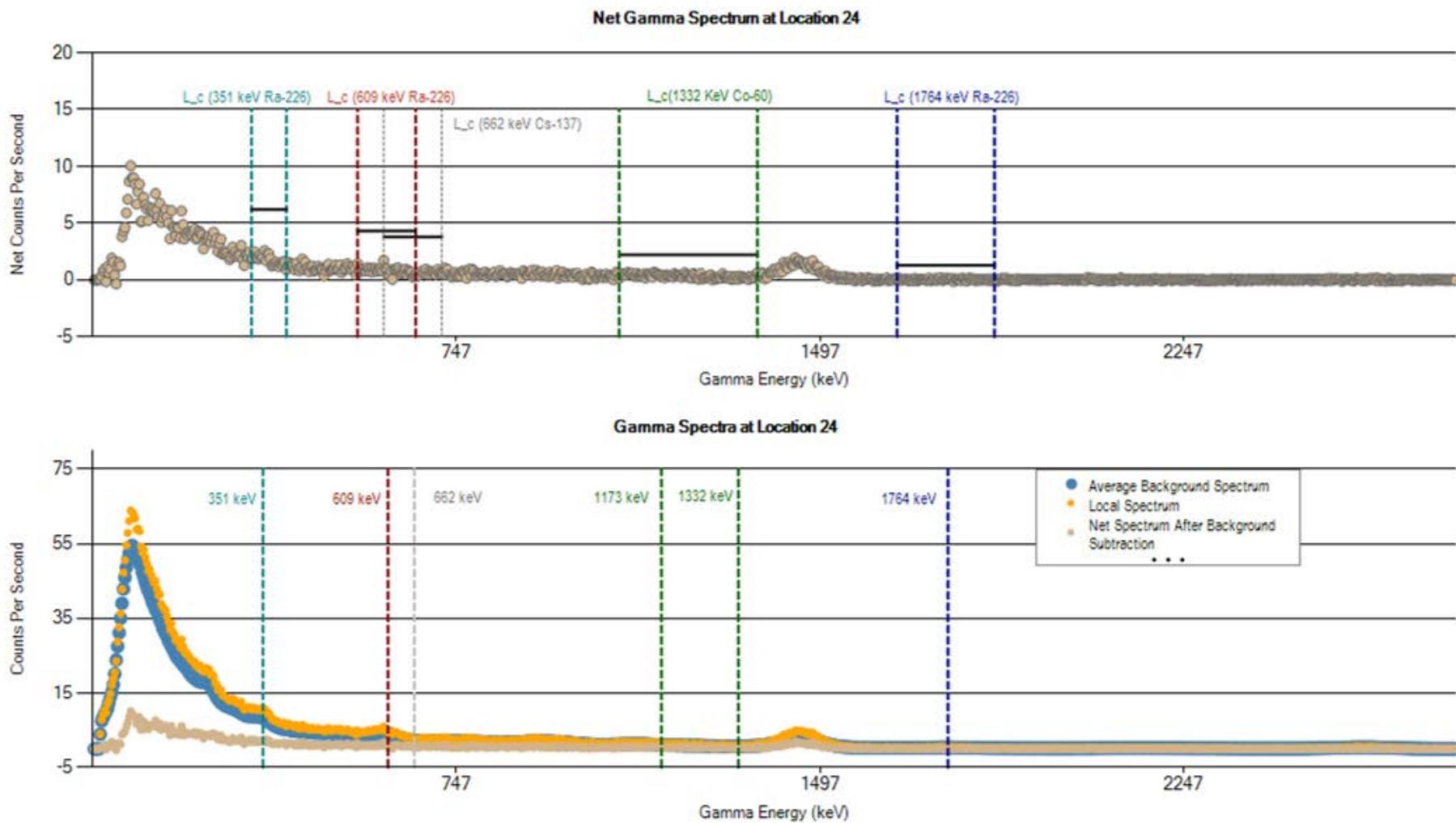
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 21 (cps)	1035	157	22	27	175	163	129	203	113	4046
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



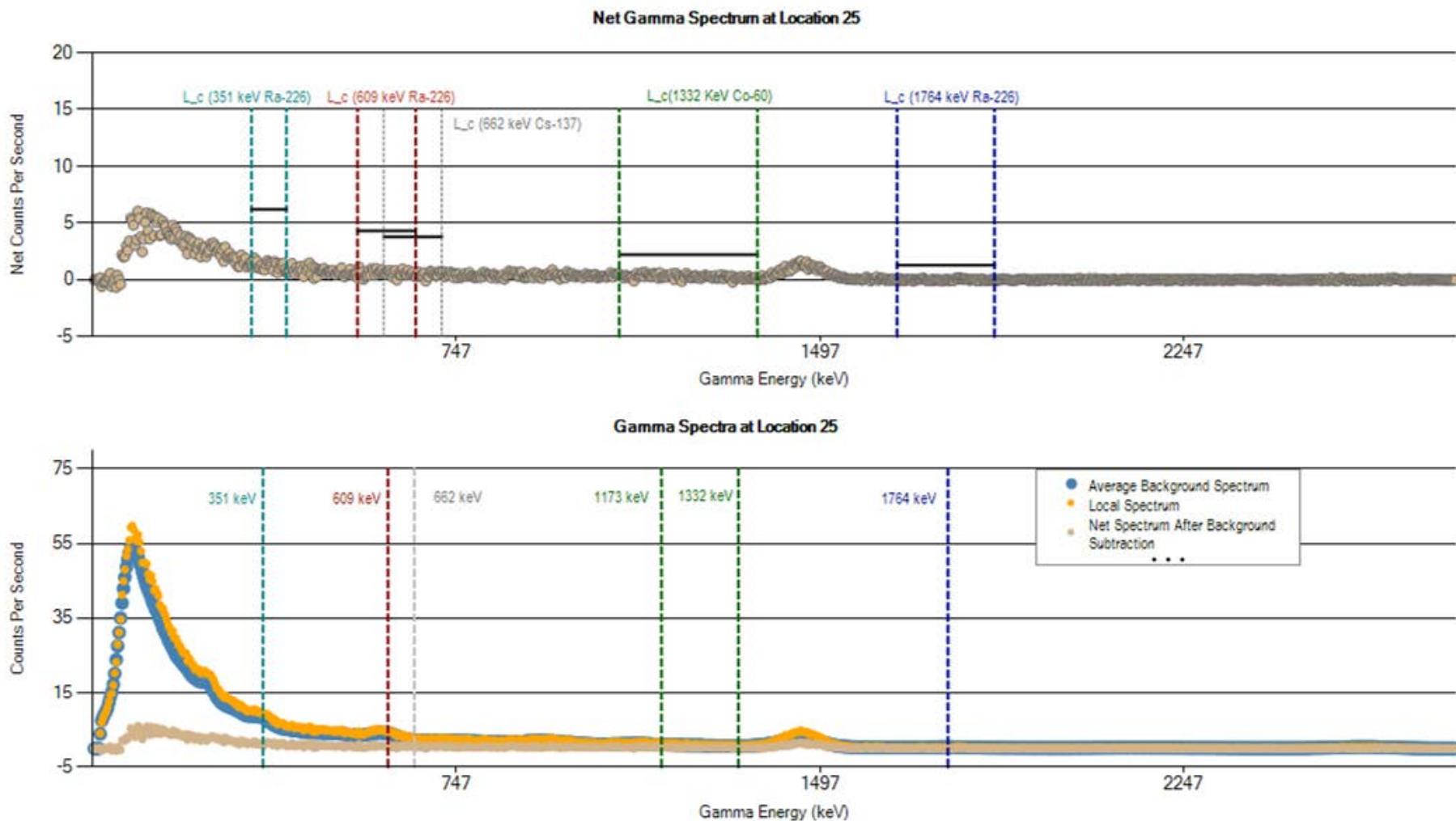
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 22 (cps)	1091	165	23	28	188	172	136	212	119	4240
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



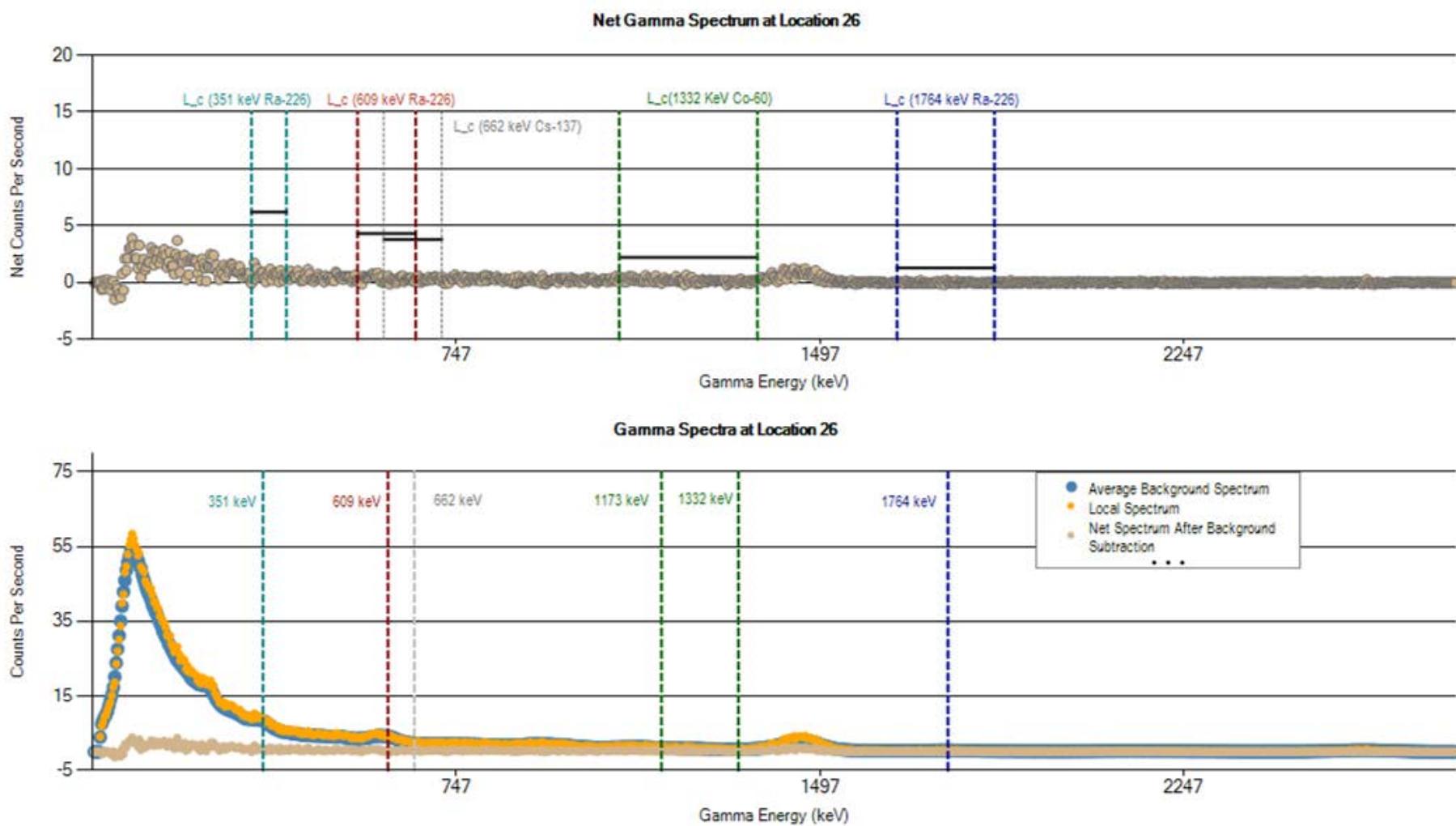
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 23 (cps)	947	134	20	24	168	151	118	192	102	3826
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



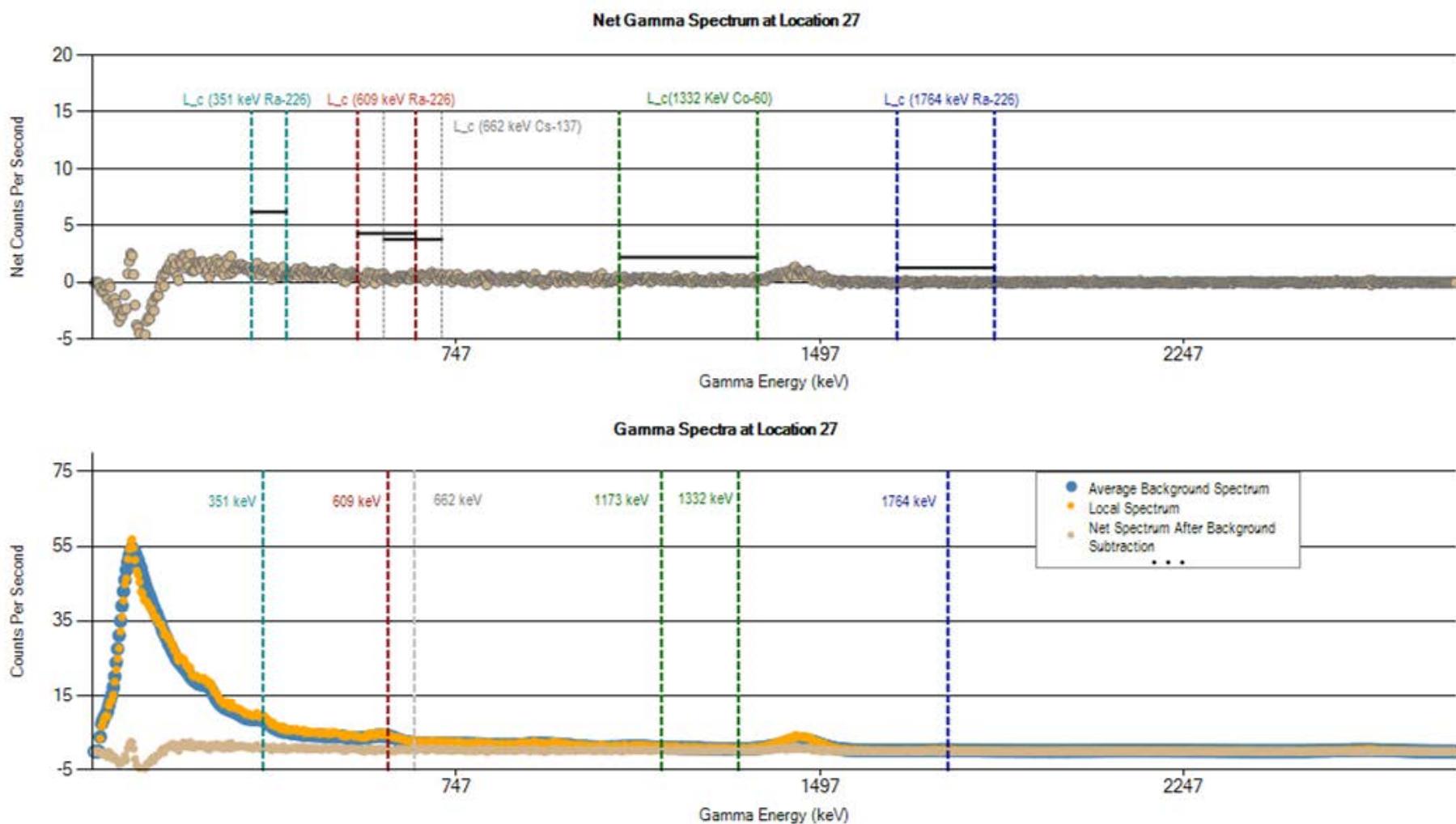
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 24 (cps)	1095	167	23	27	189	172	134	218	120	4313
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



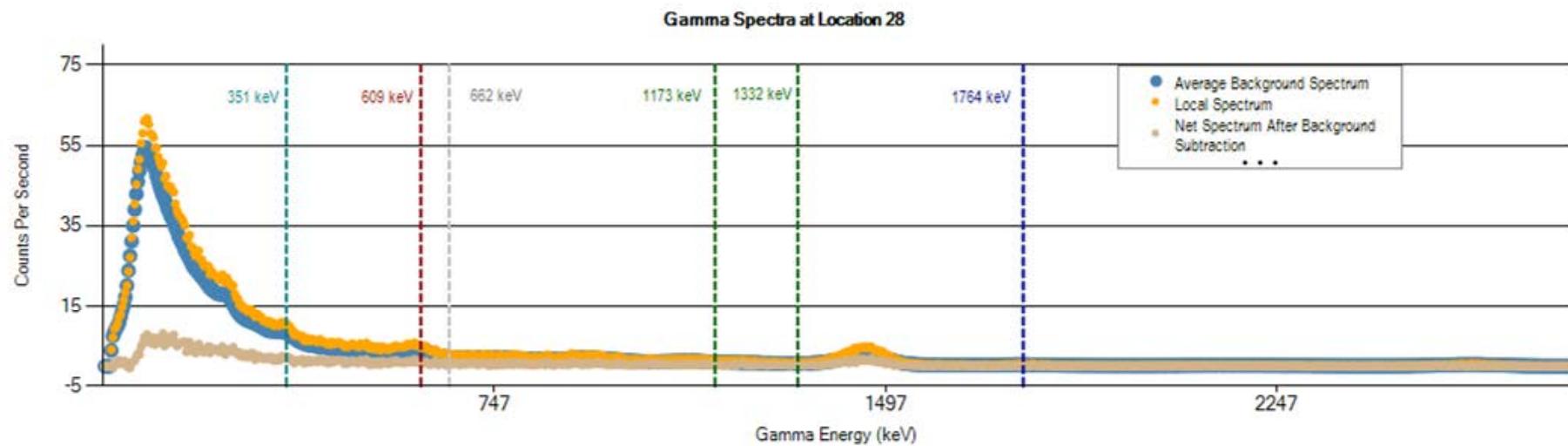
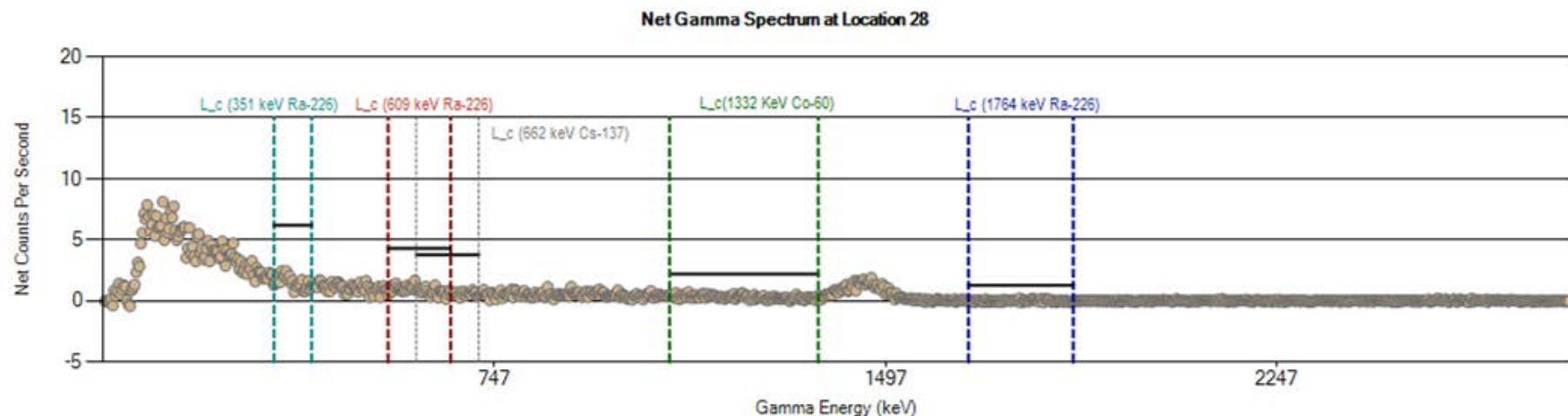
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 25 (cps)	1040	<b>159</b>	21	25	175	163	128	205	115	4120
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



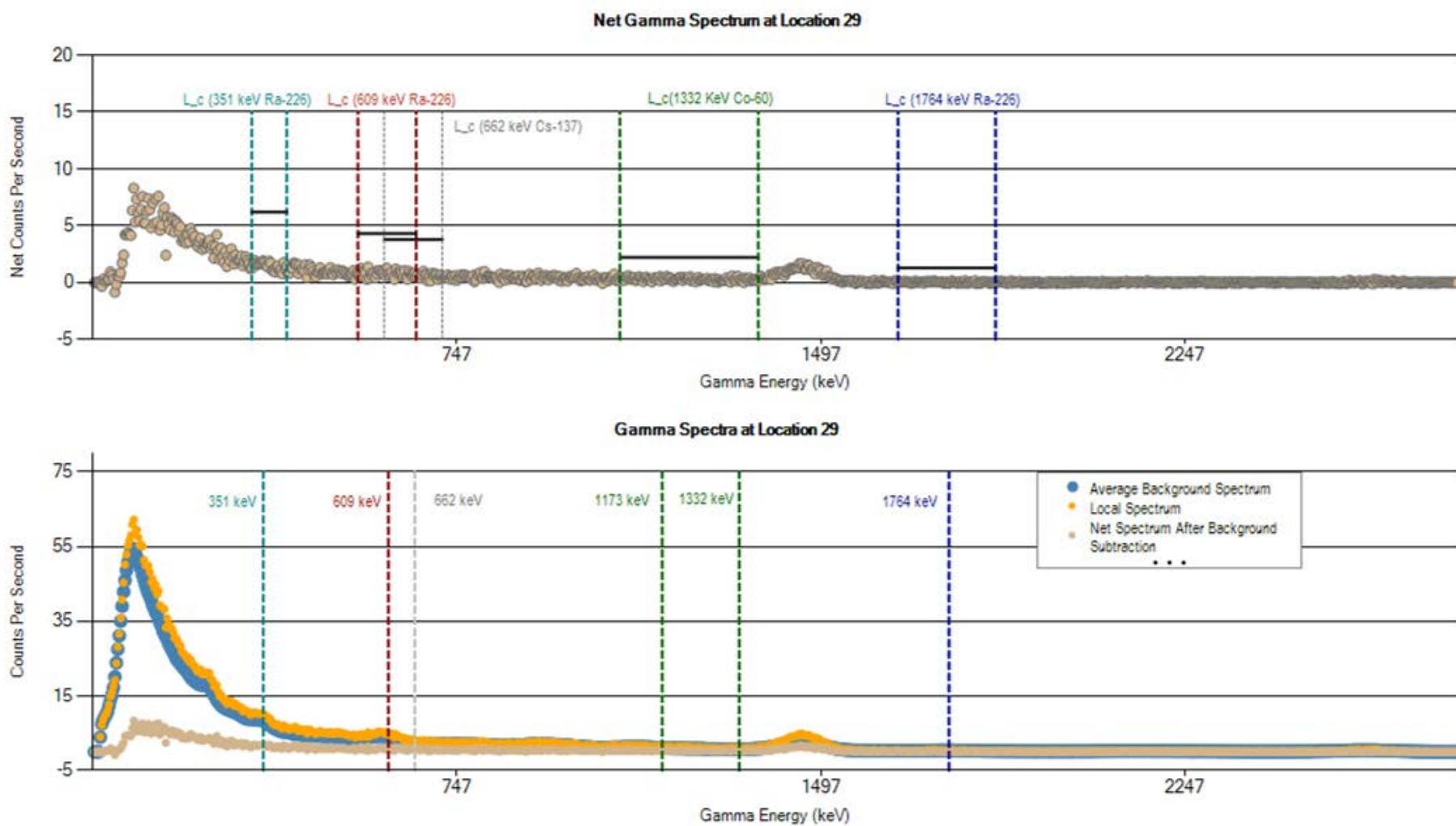
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 26 (cps)	973	145	20	24	168	154	119	191	106	3885
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



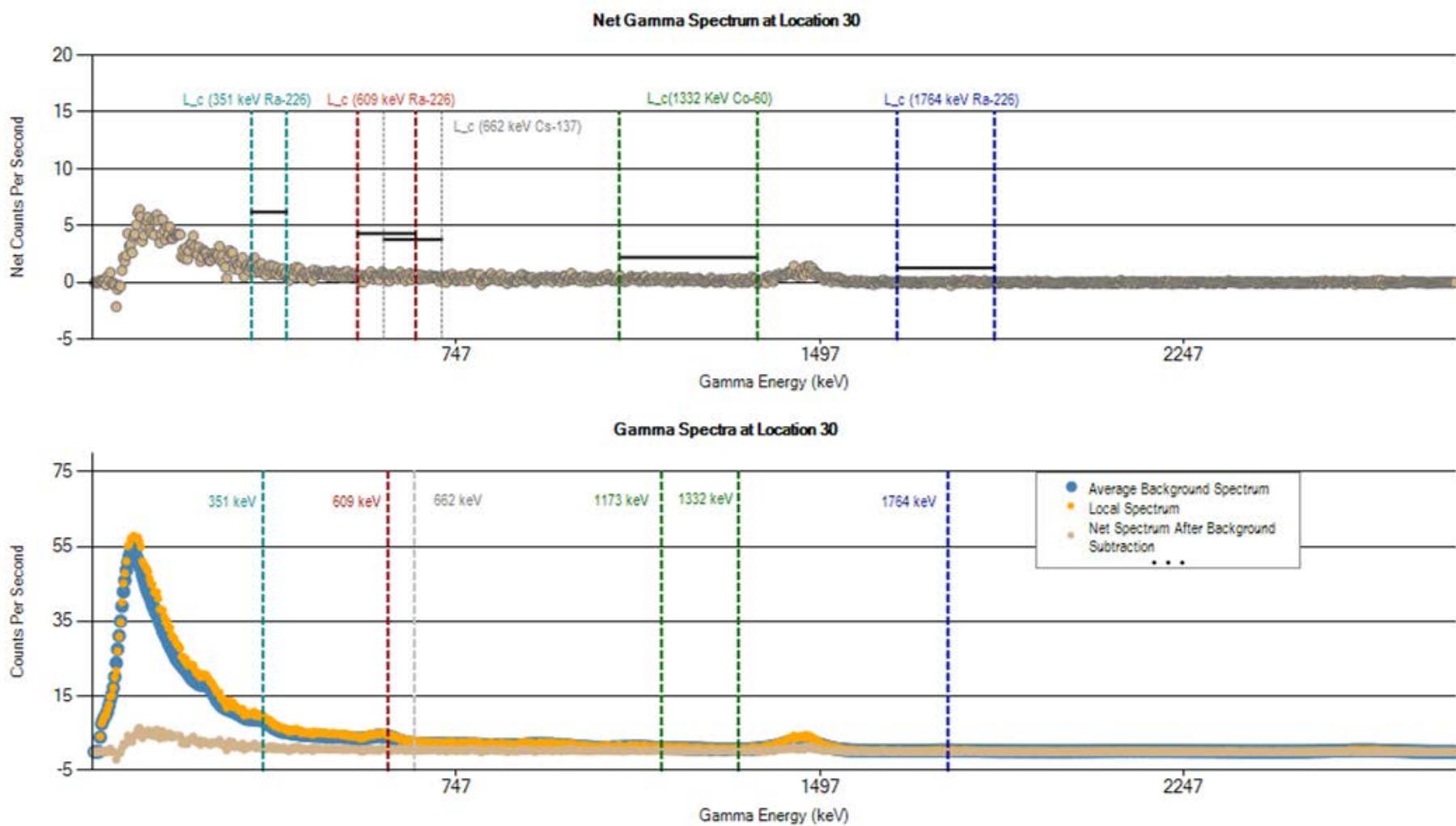
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 27 (cps)	1003	144	21	25	175	157	126	198	109	3793
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



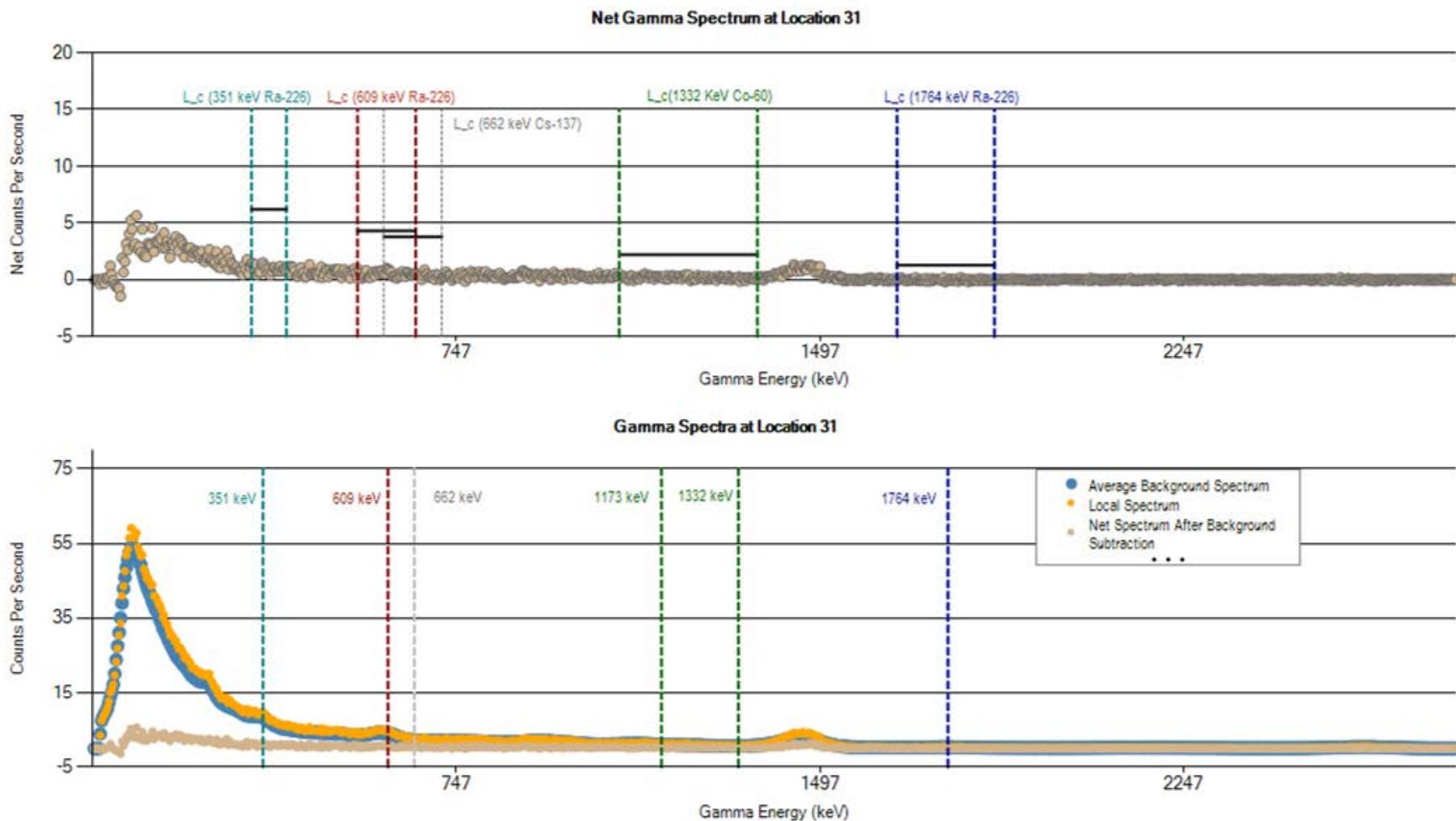
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 28 (cps)	1105	167	22	28	189	176	135	213	119	4295
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



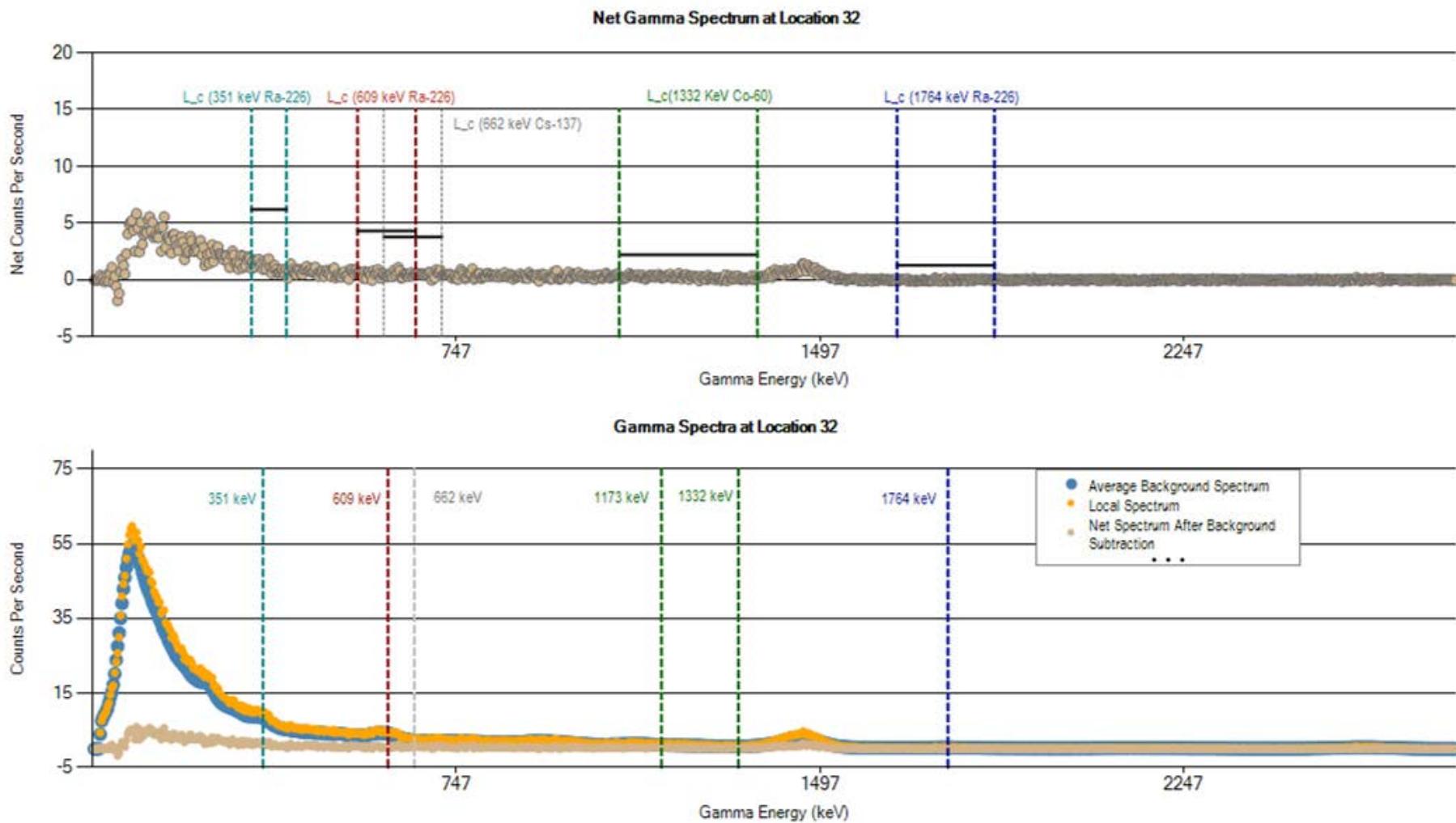
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 29 (cps)	1078	164	22	27	184	172	135	211	117	4239
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



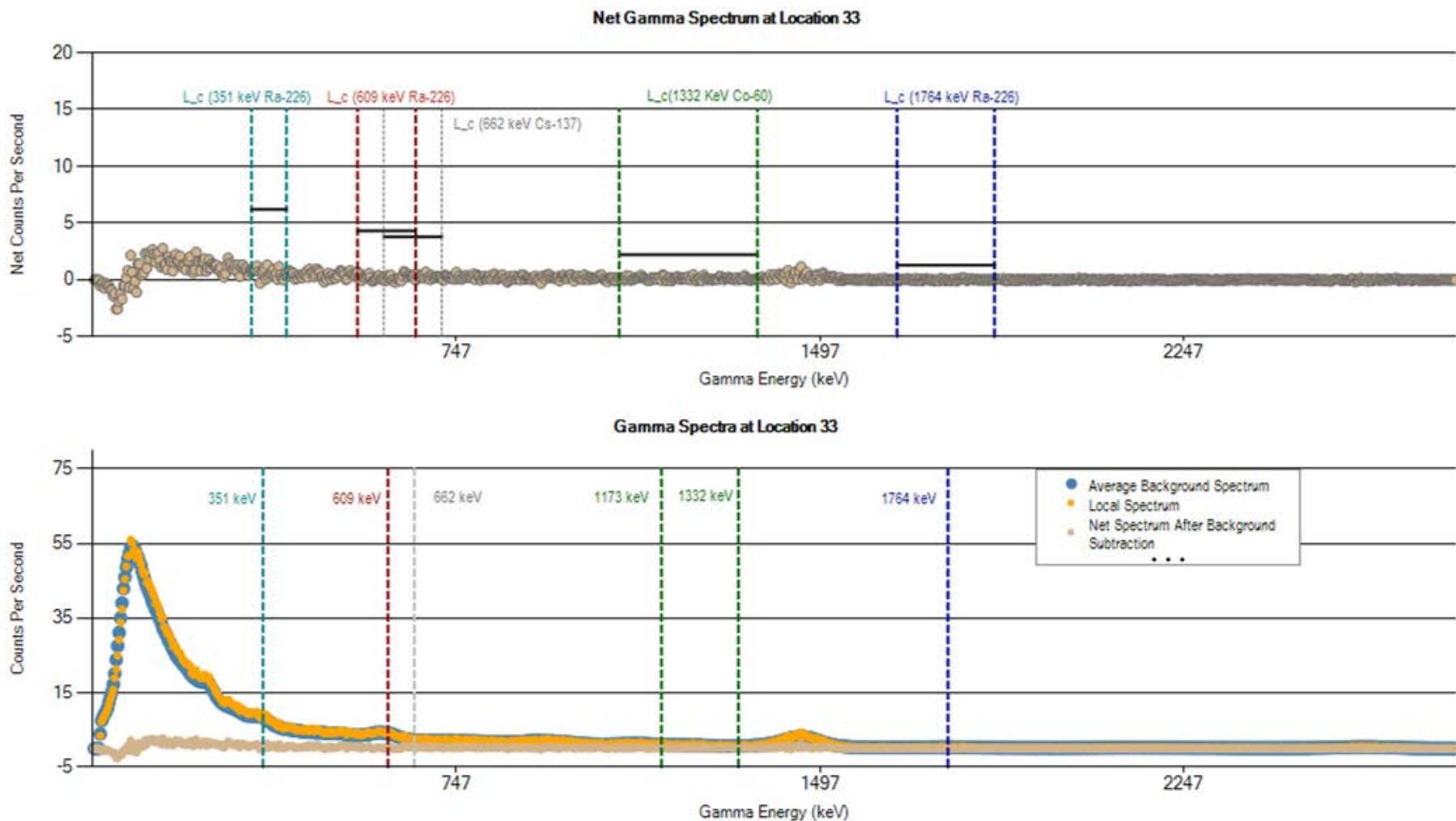
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 30 (cps)	1021	150	22	25	177	161	128	202	111	4090
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



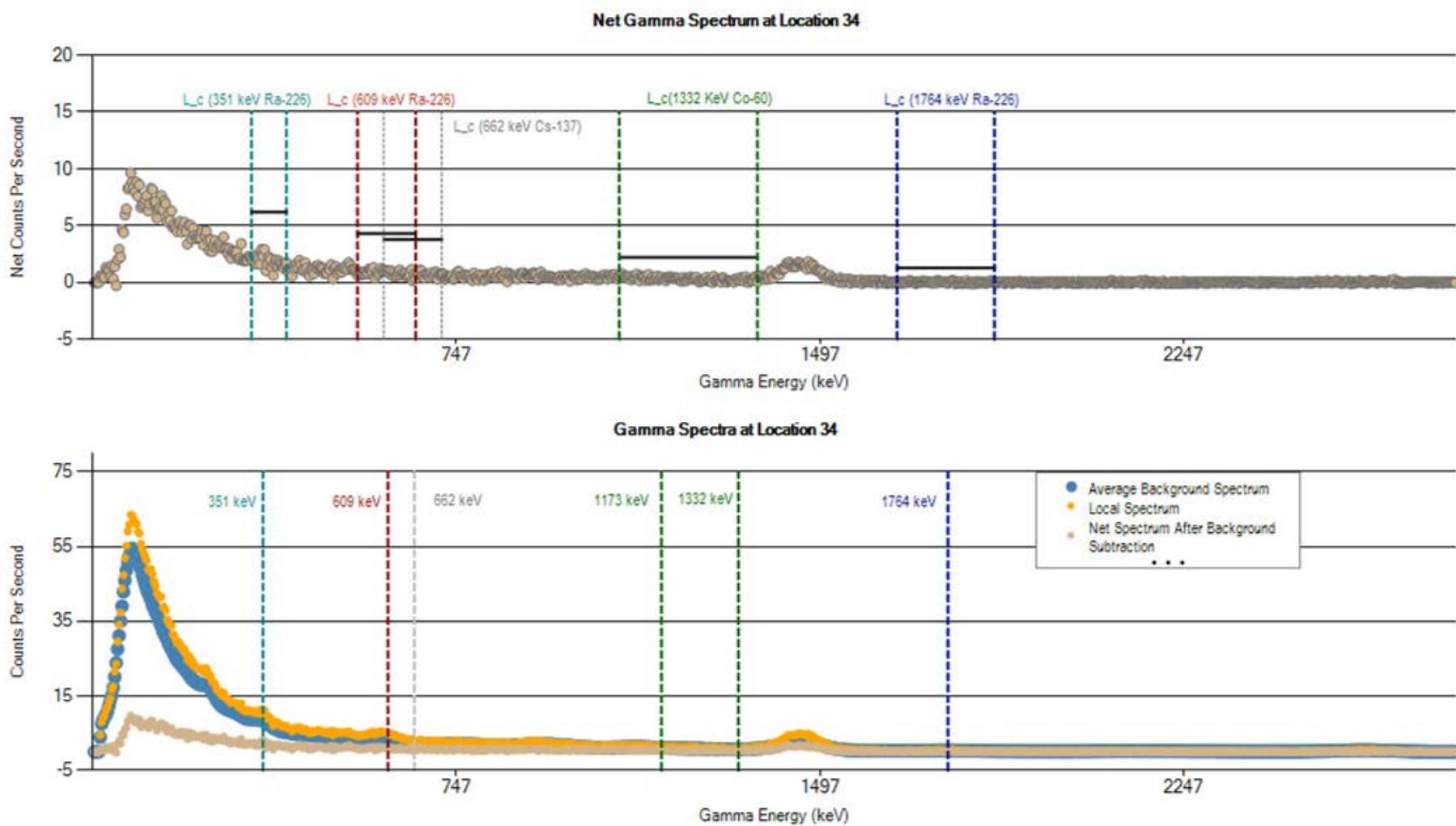
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 31 (cps)	1008	149	20	25	174	162	125	198	107	4006
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



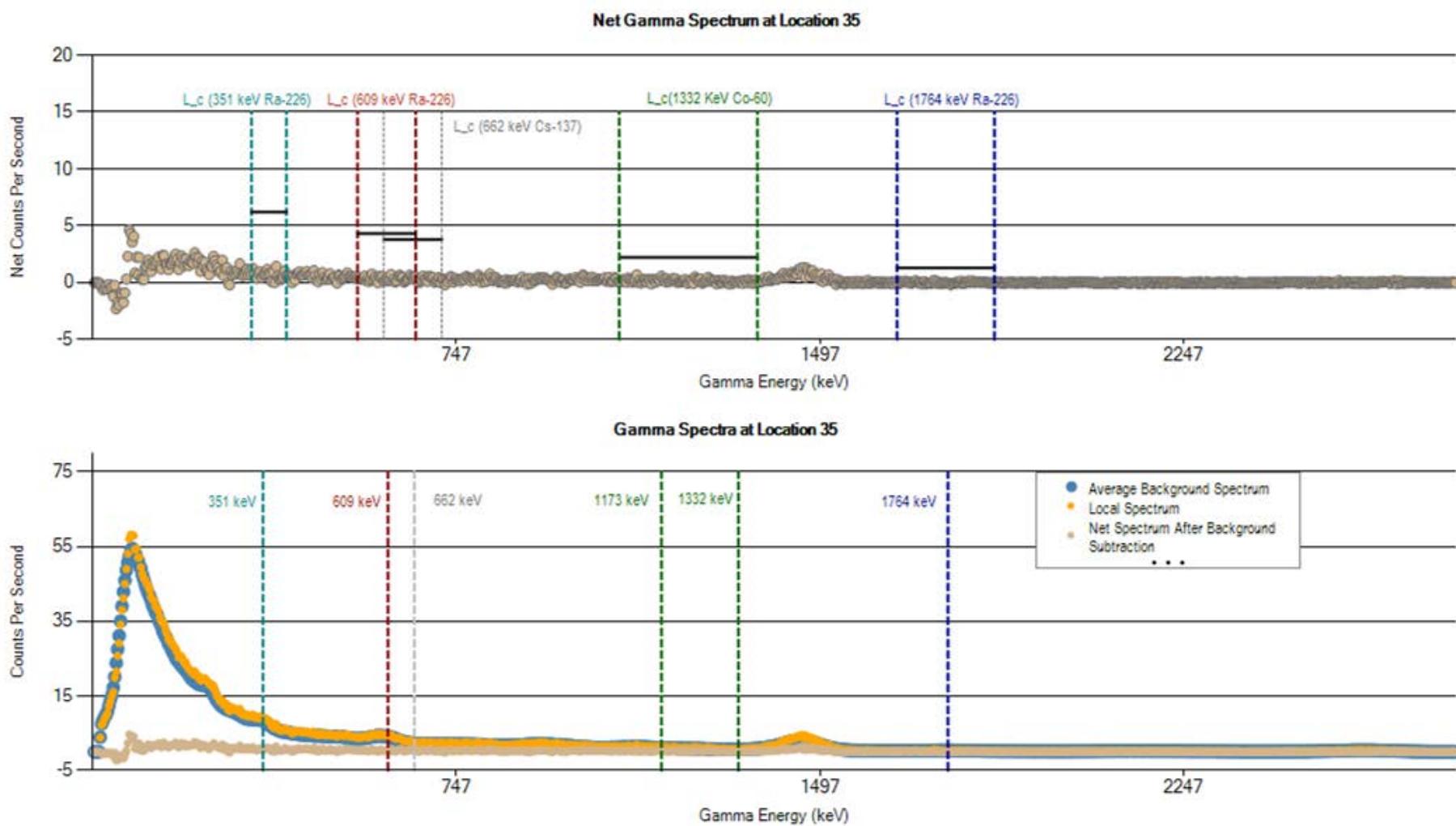
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 32 (cps)	1017	150	20	25	174	161	128	202	111	4068
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



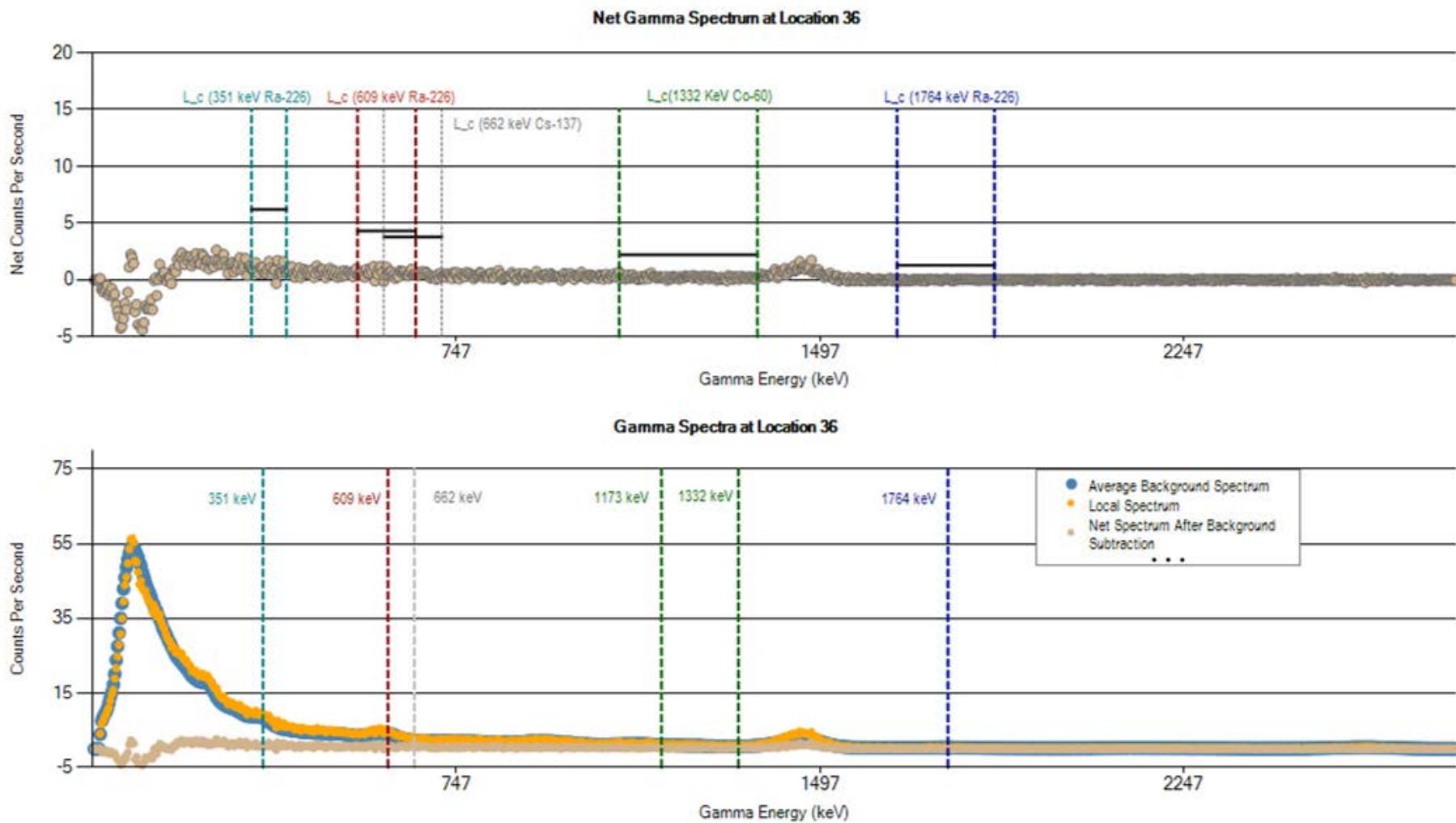
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 33 (cps)	939	130	21	24	167	149	117	189	100	3801
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



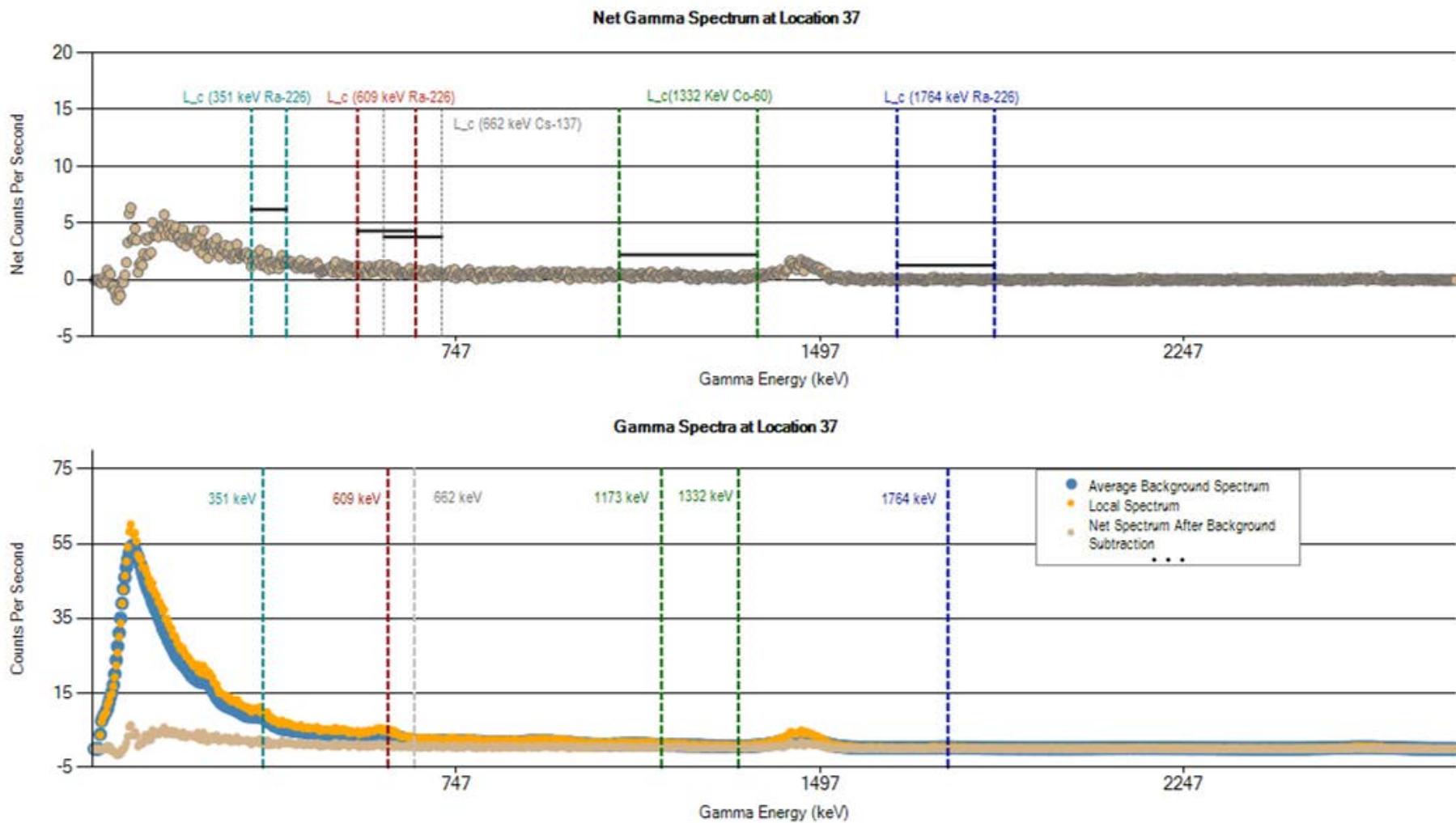
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 34 (cps)	1116	171	23	28	195	174	138	219	119	4377
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



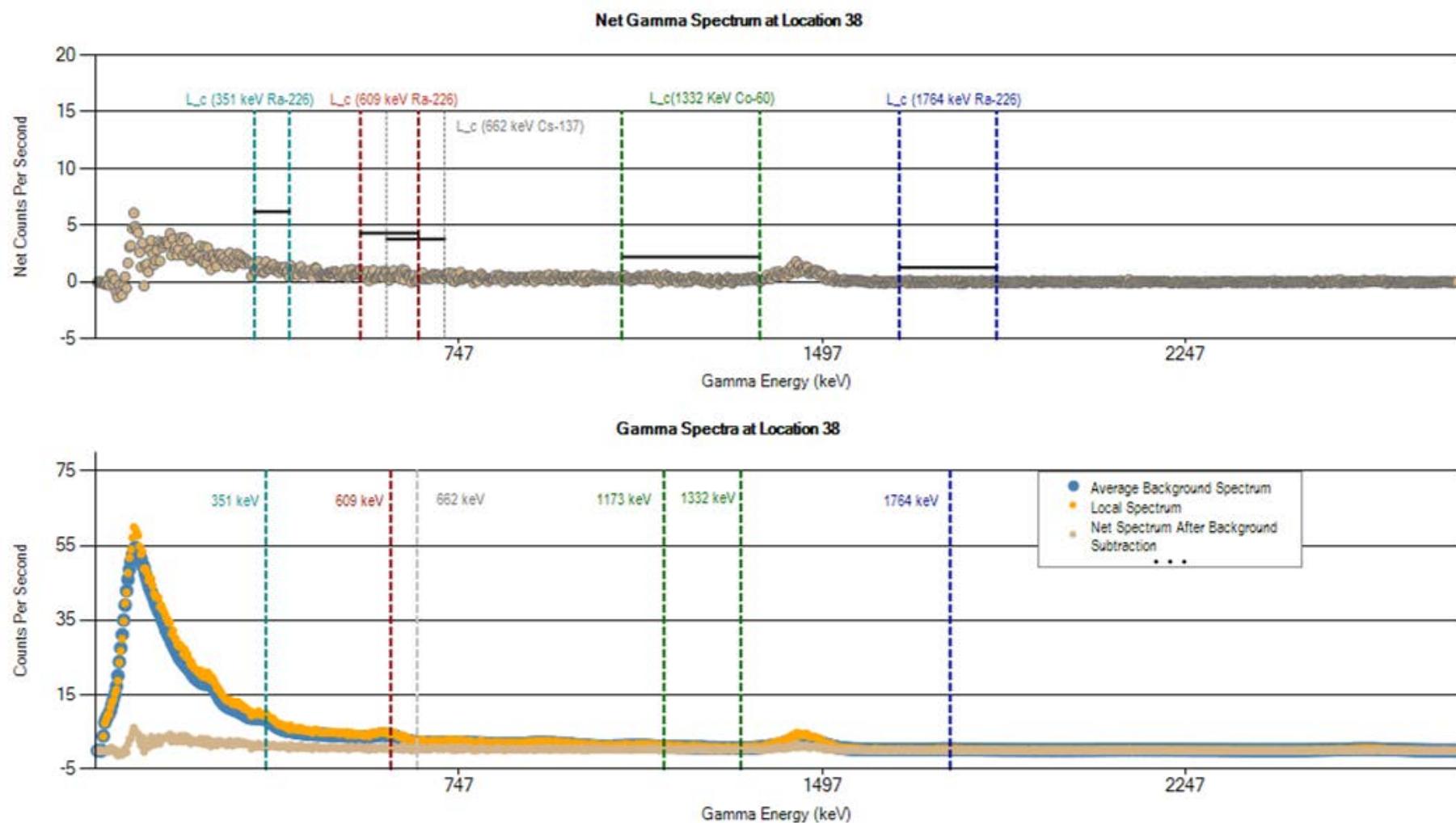
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 35 (cps)	971	144	21	25	168	155	120	191	103	3863
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



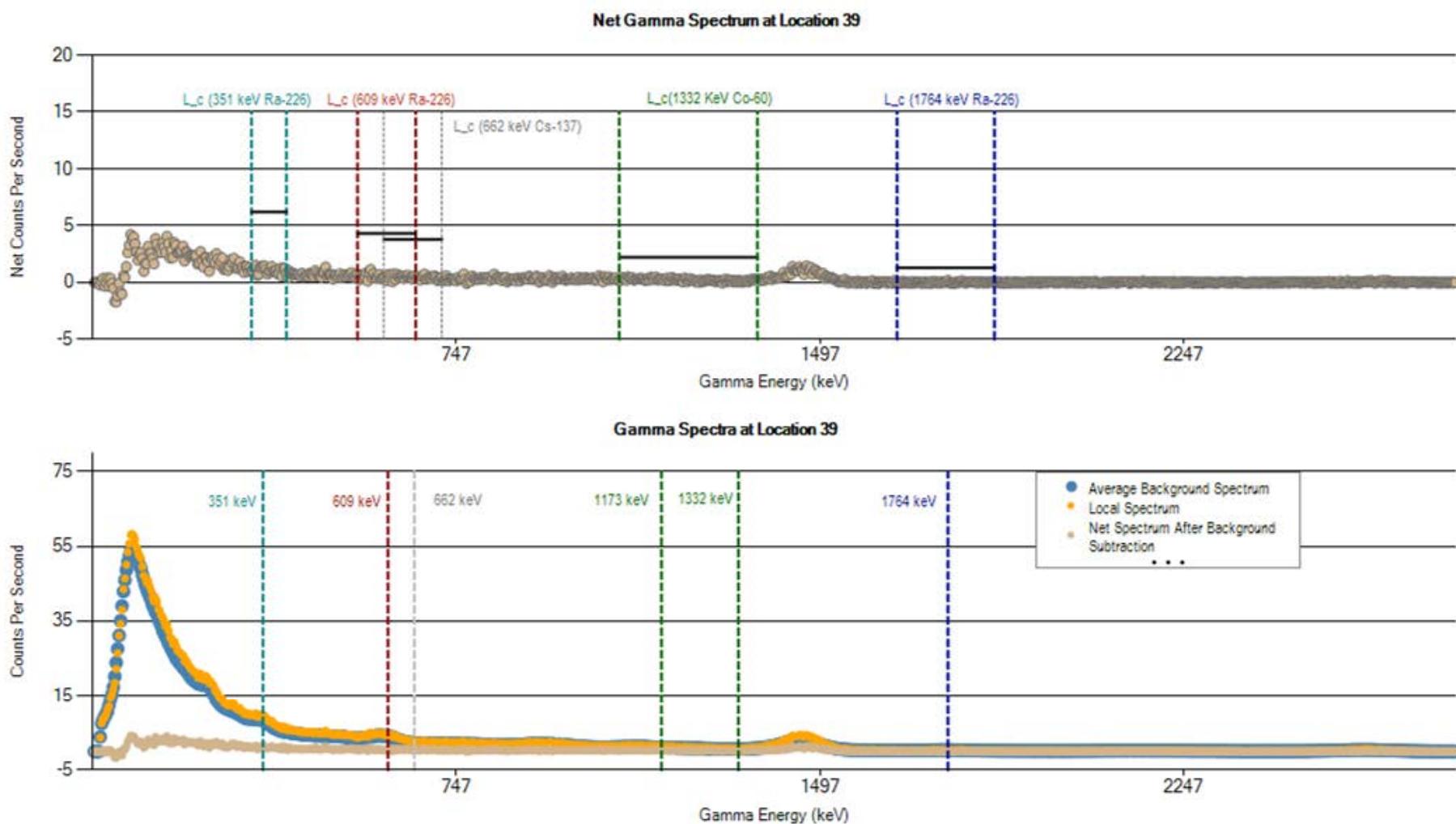
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 36 (cps)	1020	<b>152</b>	21	25	176	164	127	196	109	3819
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



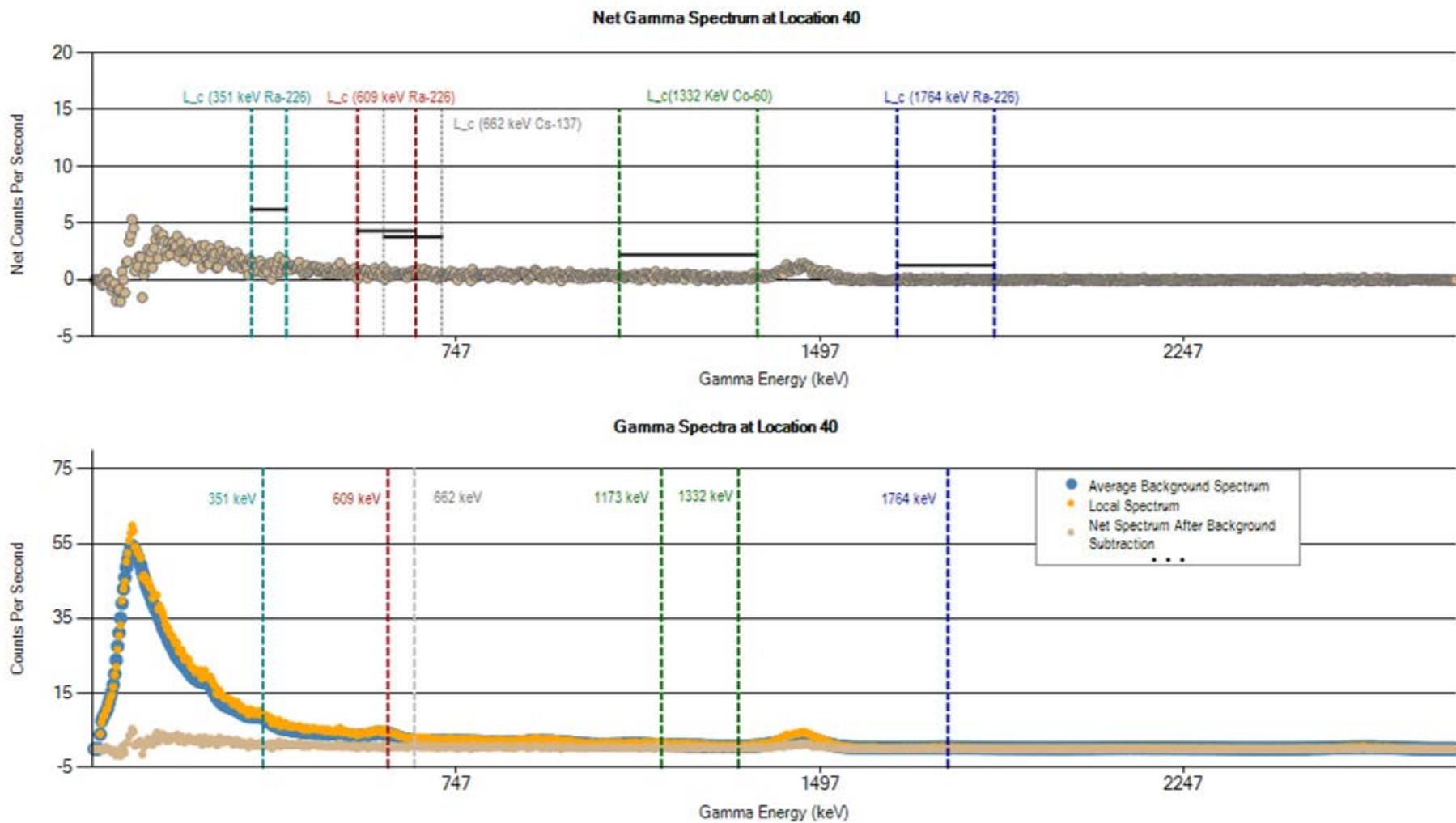
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 37 (cps)	1090	161	23	28	189	172	134	215	120	4165
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



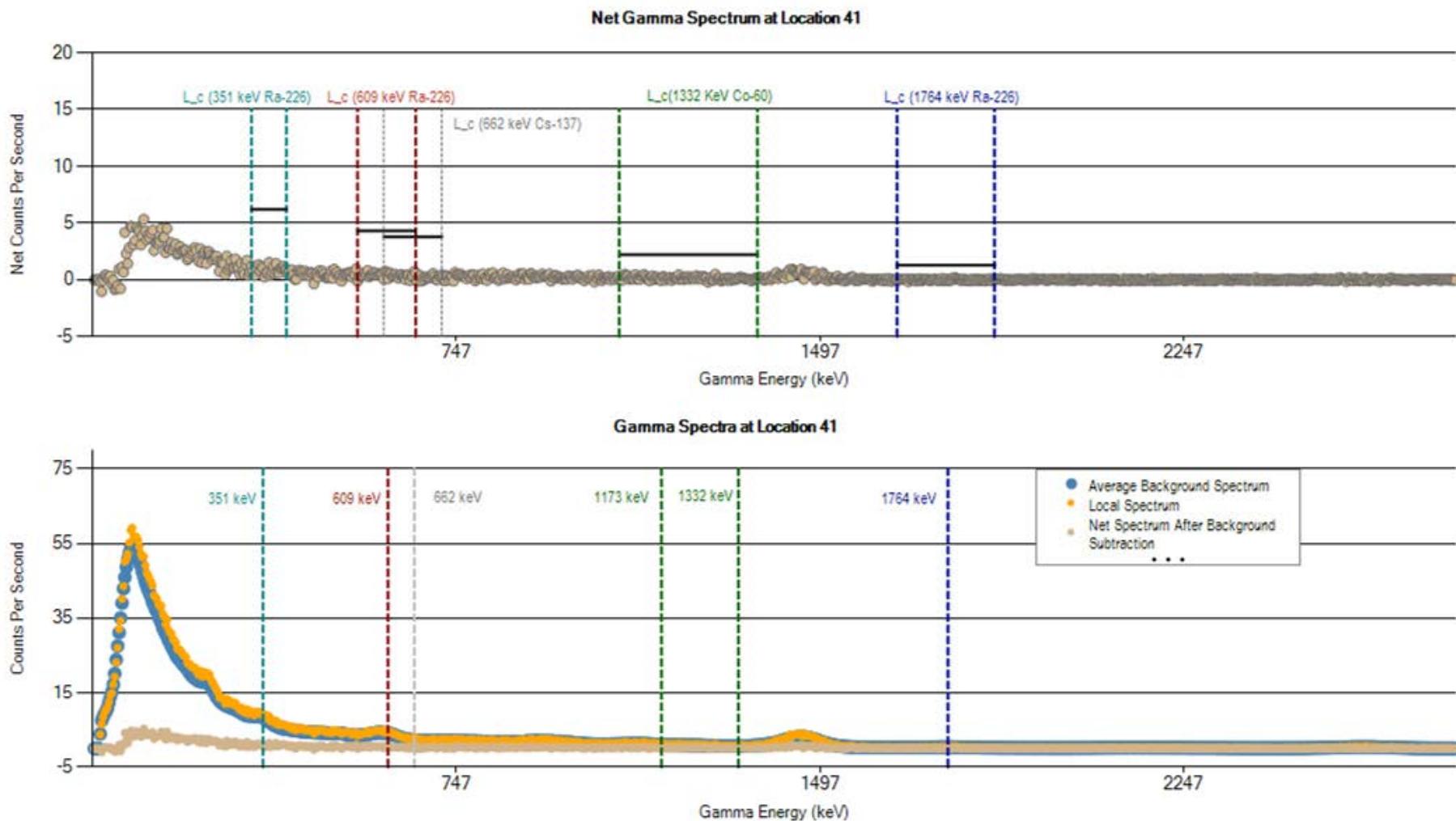
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 38 (cps)	1031	<b>154</b>	22	26	178	163	128	203	112	4036
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



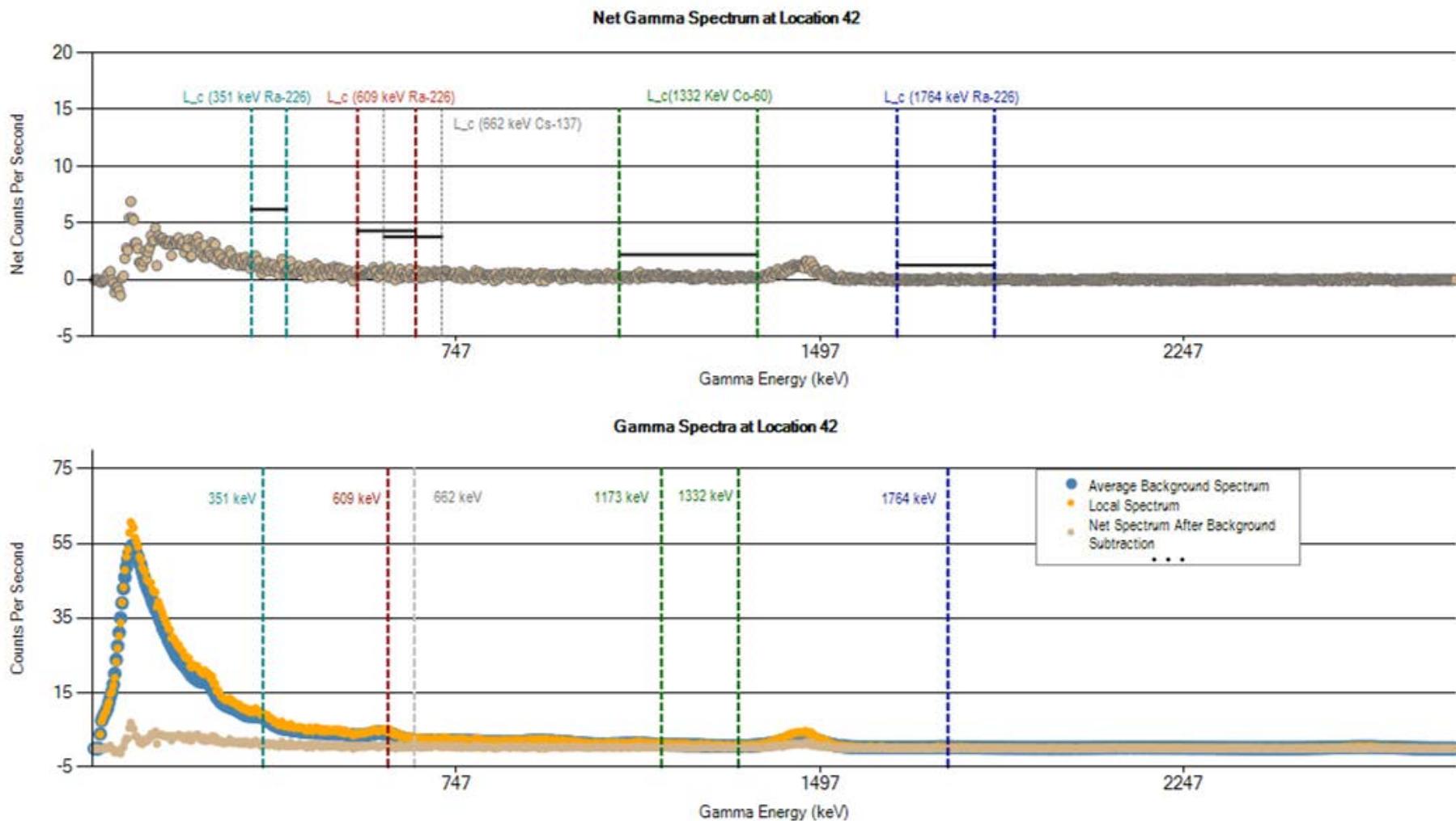
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 39 (cps)	1014	<b>153</b>	21	26	177	161	126	201	110	3988
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



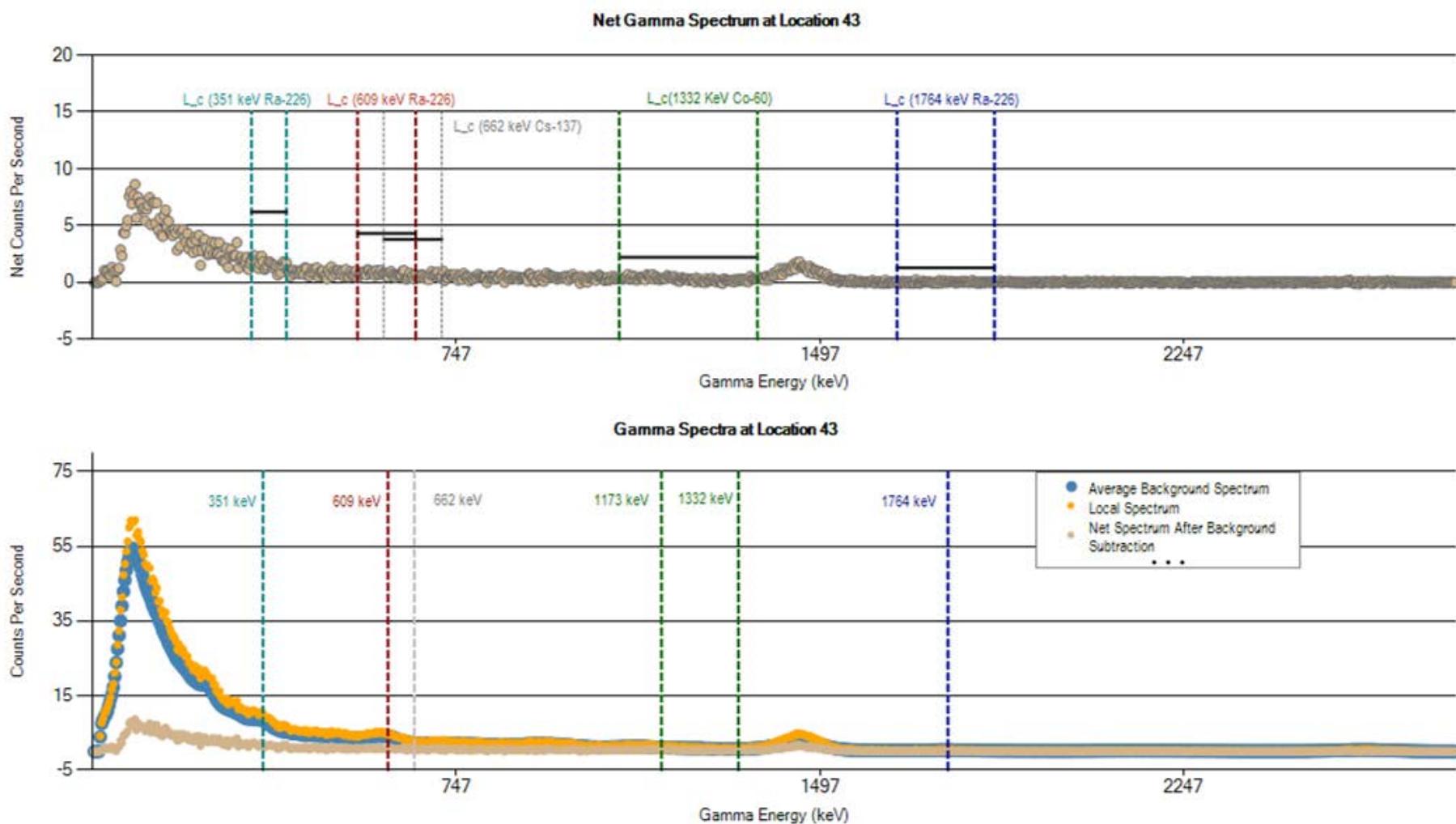
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 40 (cps)	1043	<b>154</b>	22	26	180	163	129	202	113	4017
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



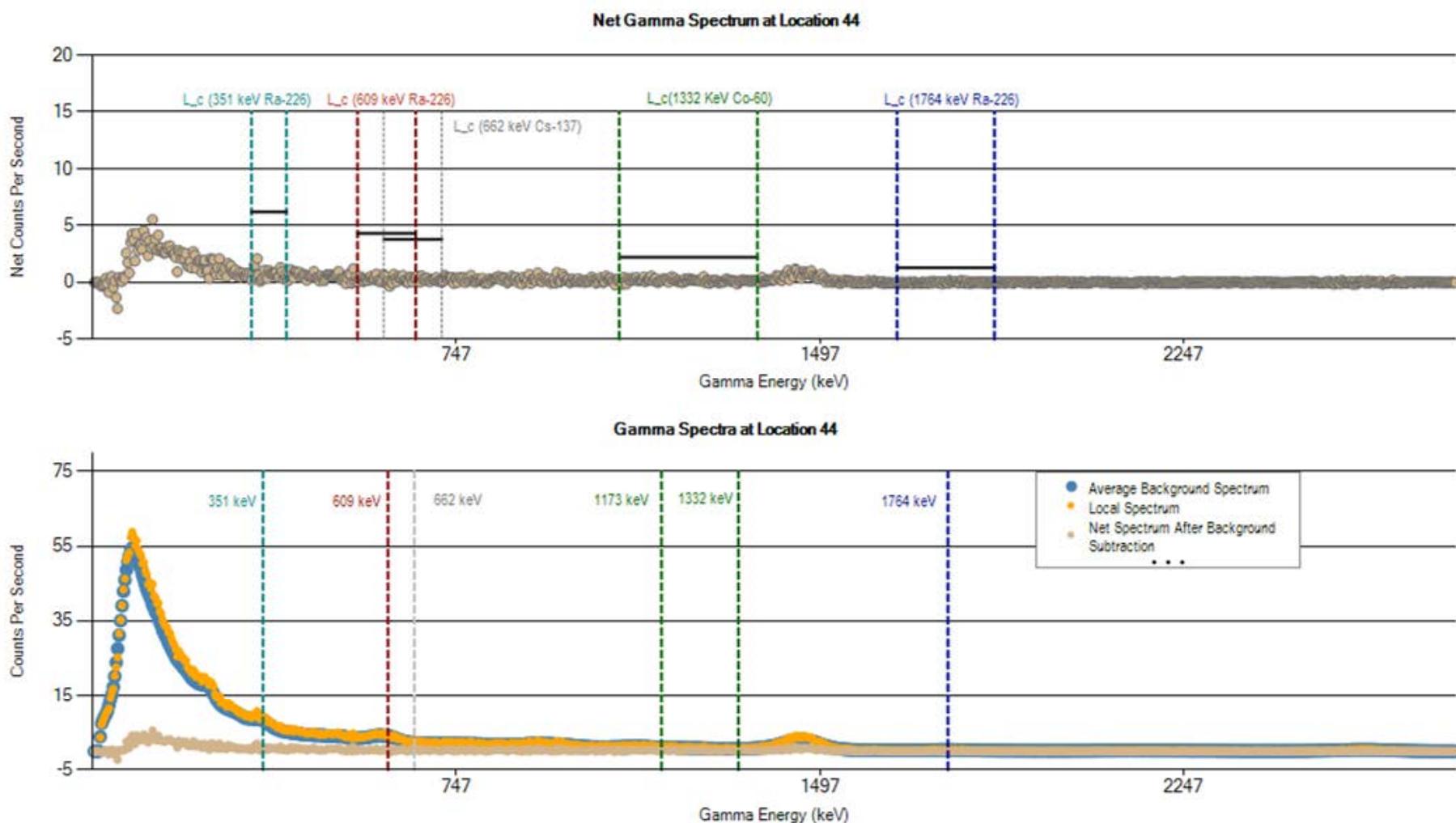
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 41 (cps)	964	136	21	25	169	157	120	196	102	3964
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



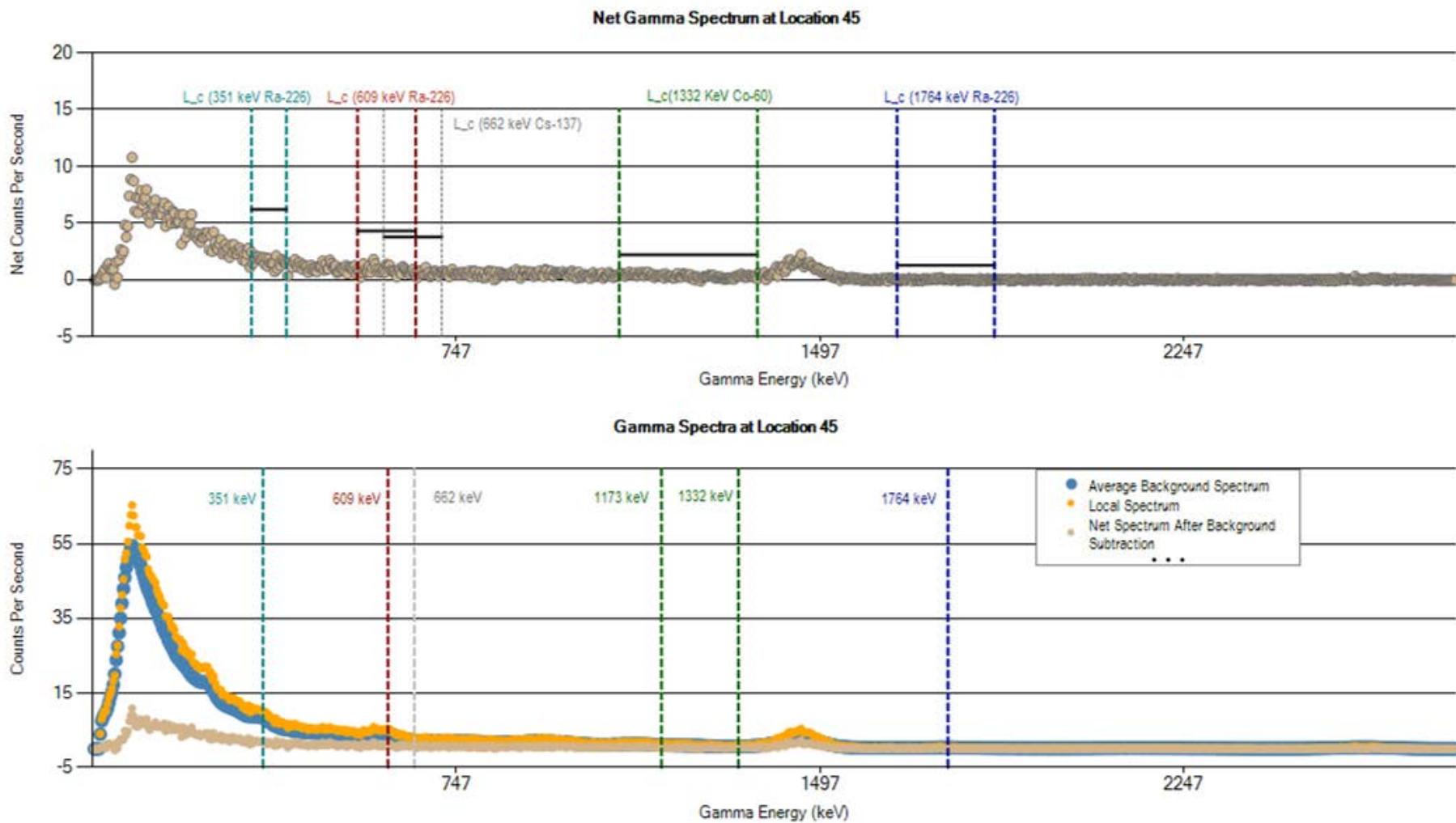
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 42 (cps)	1031	<b>156</b>	21	25	177	164	129	203	113	4049
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



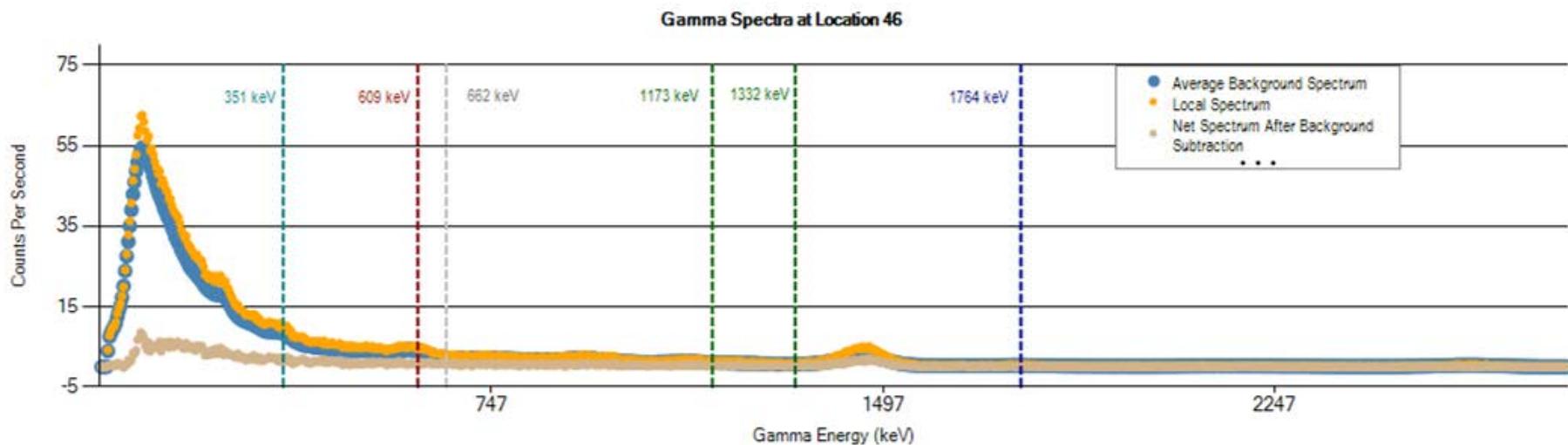
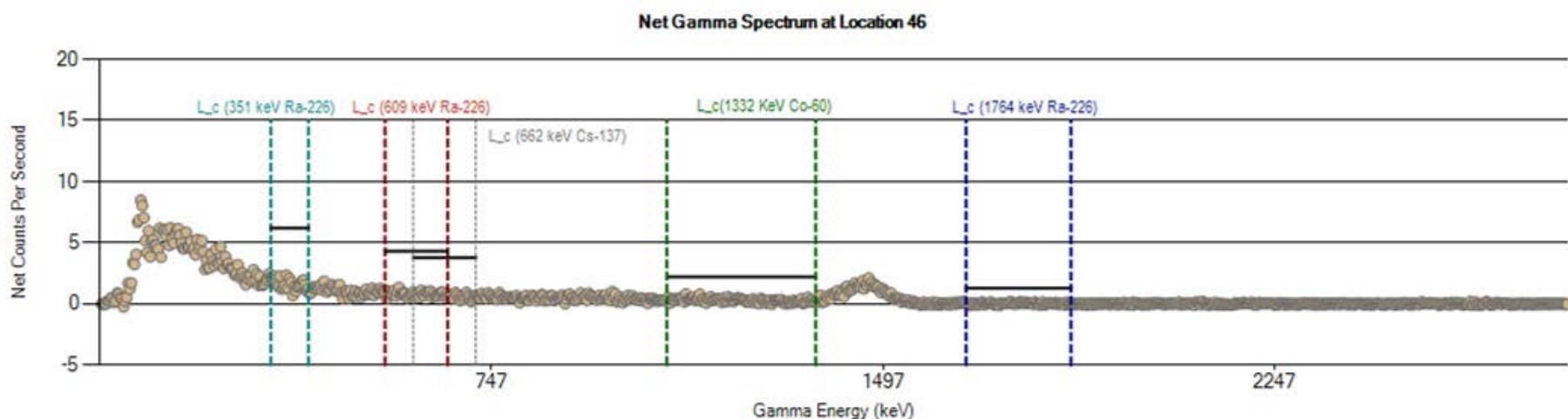
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 43 (cps)	1066	163	22	25	184	170	133	213	116	4242
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



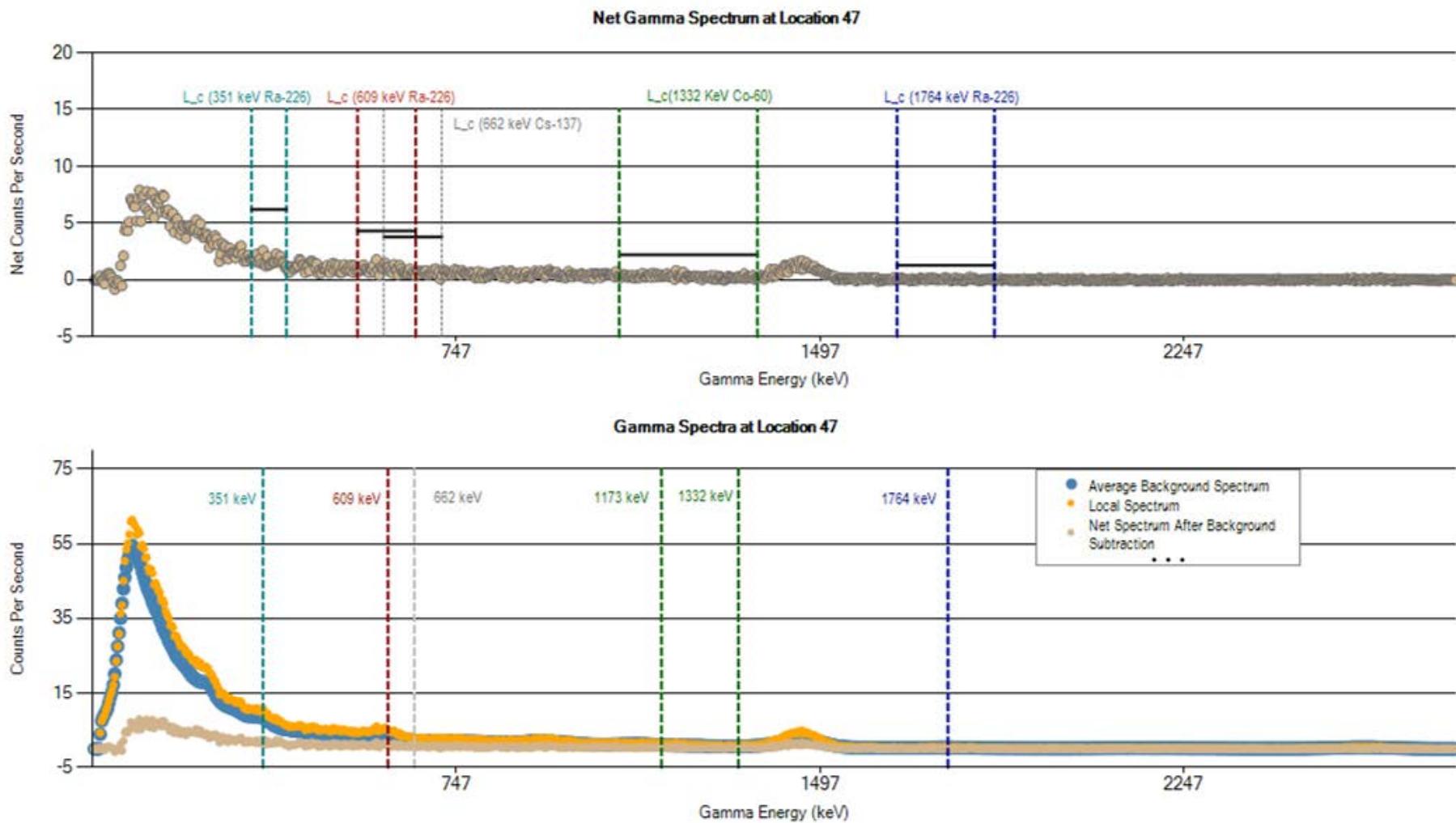
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 44 (cps)	961	140	20	24	168	152	117	193	105	3915
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



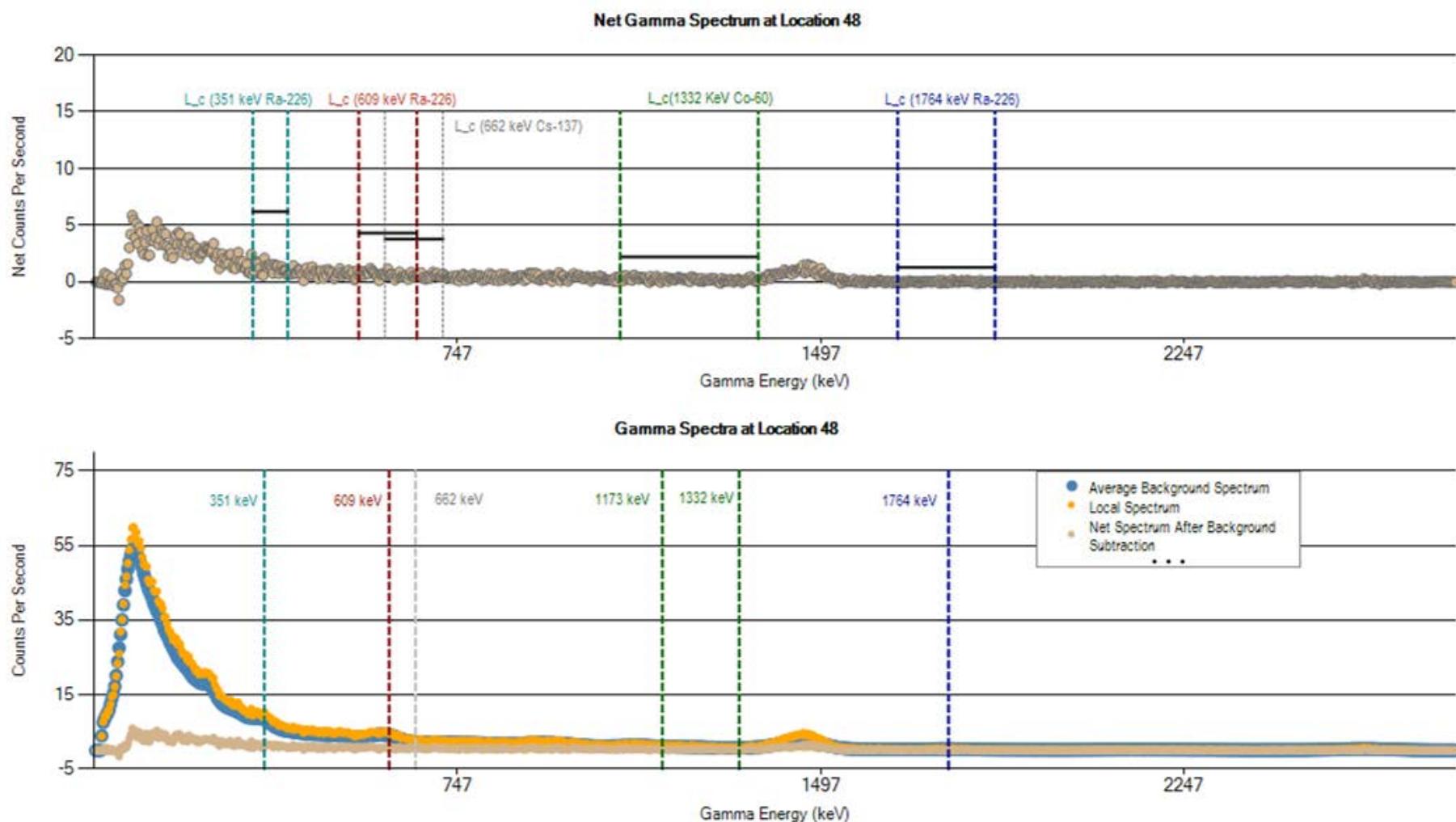
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 45 (cps)	1106	168	22	27	191	175	137	214	121	4328
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 46 (cps)	1095	170	23	26	186	173	136	214	118	4260
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 47 (cps)	1094	160	24	27	190	176	137	216	117	4297
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 48 (cps)	1042	157	22	25	181	167	130	205	111	4084
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

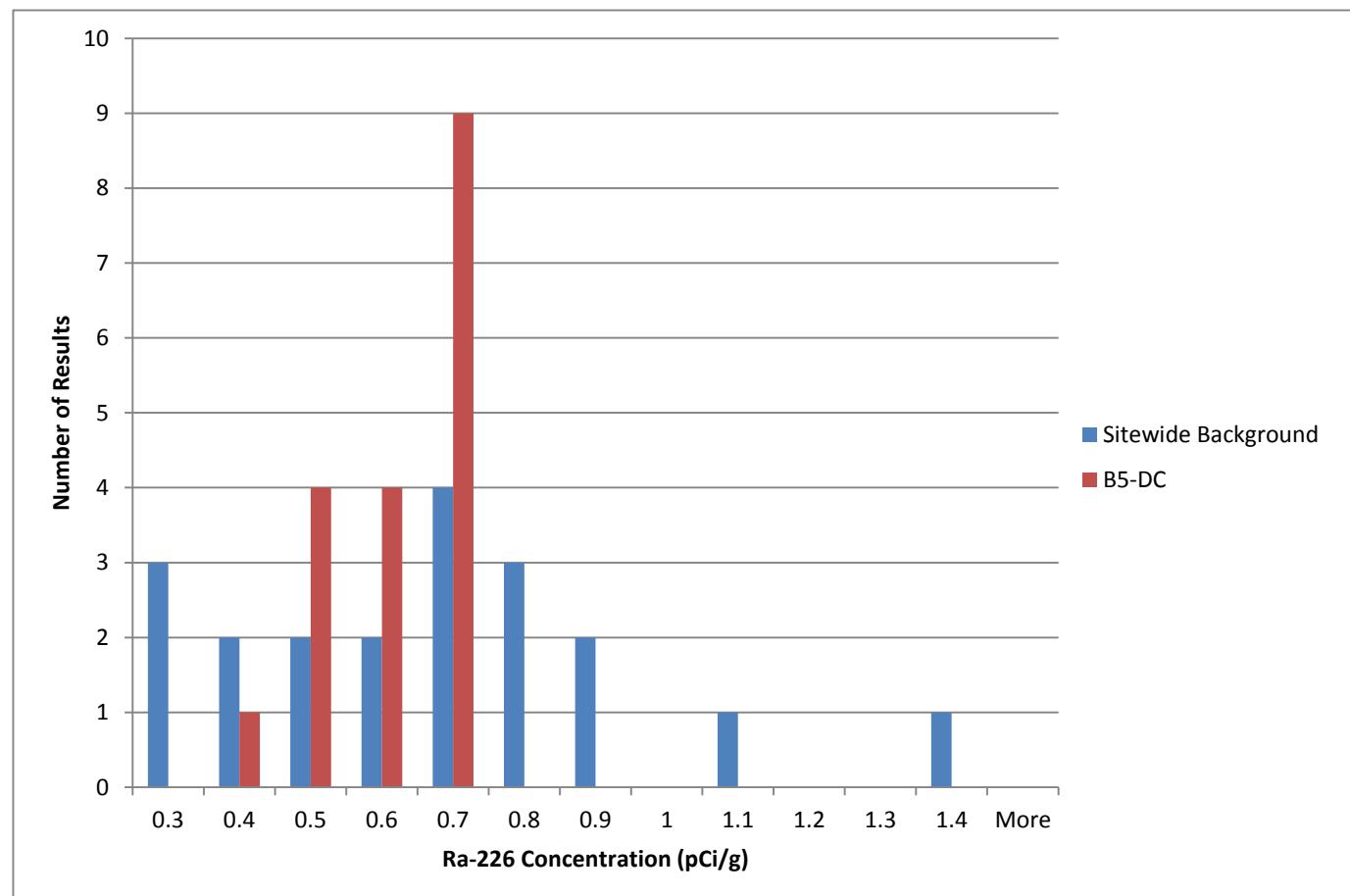
## Histogram, RSY B5 (DC) vs. Sitewide Background

## Background

Bin	Frequency
0.3	3
0.4	2
0.5	2
0.6	2
0.7	4
0.8	3
0.9	2
1	0
1.1	1
1.2	0
1.3	0
1.4	1
More	0

## B5-DC

Bin	Frequency
0.3	0
0.4	1
0.5	4
0.6	4
0.7	9
0.8	0
0.9	0
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



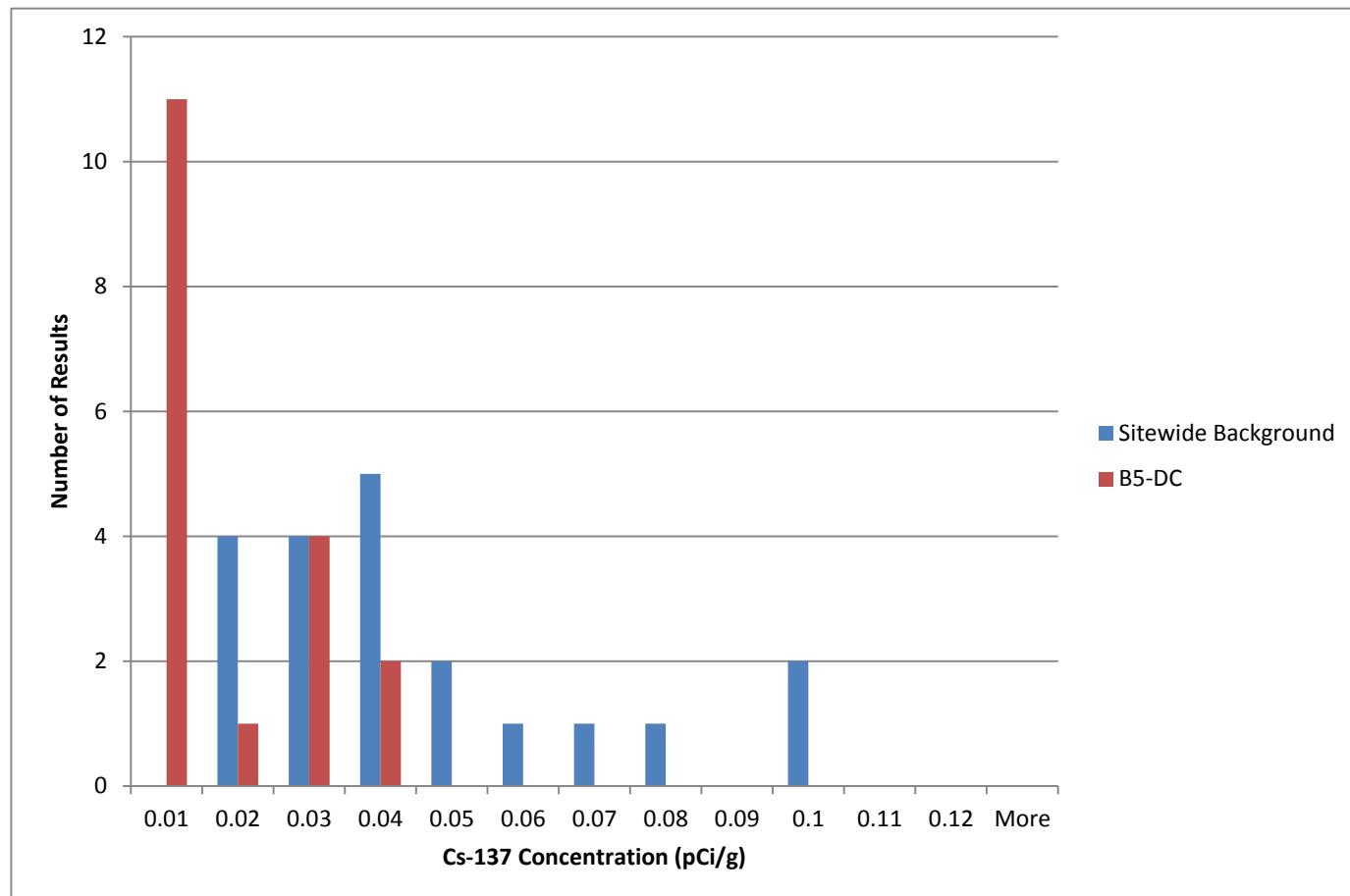
## Histogram, RSY B5 (DC) vs. Sitewide Background

## Background

Bin	Frequency
0.01	0
0.02	4
0.03	4
0.04	5
0.05	2
0.06	1
0.07	1
0.08	1
0.09	0
0.1	2
0.11	0
0.12	0
More	0

## B5-DC

Bin	Frequency
0.01	11
0.02	1
0.03	4
0.04	2
0.05	0
0.06	0
0.07	0
0.08	0
0.09	0
0.1	0
0.11	0
0.12	0
More	0



# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

TestAmerica Job ID: 160-30233-2

Client Project/Site: Hunters Point Naval Shipyard - Parcel E2

For:

Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Eddie Kalombo

*micha korrinhizer*

Authorized for release by:

9/12/2018 2:03:49 PM

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Designee for

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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## Case Narrative

Client: Optim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Job ID: 160-30233-2**

**Laboratory: TestAmerica St. Louis**

Narrative

### CASE NARRATIVE

**Client: Optim Federal Services LLC**

**Project: Hunters Point Naval Shipyard - Parcel E2**

**Report Number: 160-30233-2**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup

Method 3620C: Florisil Cleanup

Method 3630C: Silica Gel Cleanup

Method 3640A: Gel-Permeation Cleanup

Method 3650B: Acid-Base Partition Cleanup

Method 3660B: Sulfur Cleanup

Method 3665A: Sulfuric Acid/Permanganate Cleanup

## Case Narrative

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

### **Job ID: 160-30233-2 (Continued)**

#### **Laboratory: TestAmerica St. Louis (Continued)**

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

#### **RECEIPT**

The samples were received on 08/17/2018; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 18.0° C.

#### **TOTAL BETA STRONTIUM (GFPC)**

Samples PE2-RSYB5-DC-S001 (160-30233-1) and PE2-RSYB5-DC-S011 (160-30233-11) were analyzed for Total Beta Strontium (GFPC) in accordance with EPA 905. The samples were dried on 08/17/2018, prepared on 08/23/2018 and analyzed on 09/10/2018.

The following samples in batch 160-384836 could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: PE2-RSYB5-DC-S001 (160-30233-1) and PE2-RSYB5-DC-S011 (160-30233-11). The samples contained detritus material and rocks of varying sizes.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)**

Samples PE2-RSYB5-DC-S001 (160-30233-1), PE2-RSYB5-DC-S002 (160-30233-2), PE2-RSYB5-DC-S003 (160-30233-3), PE2-RSYB5-DC-S004 (160-30233-4), PE2-RSYB5-DC-S005 (160-30233-5), PE2-RSYB5-DC-S006 (160-30233-6), PE2-RSYB5-DC-S007 (160-30233-7), PE2-RSYB5-DC-S008 (160-30233-8), PE2-RSYB5-DC-S009 (160-30233-9), PE2-RSYB5-DC-S010 (160-30233-10), PE2-RSYB5-DC-S011 (160-30233-11), PE2-RSYB5-DC-S012 (160-30233-12), PE2-RSYB5-DC-S013 (160-30233-13), PE2-RSYB5-DC-S014 (160-30233-14), PE2-RSYB5-DC-S015 (160-30233-15), PE2-RSYB5-DC-S016 (160-30233-16), PE2-RSYB5-DC-S017 (160-30233-17) and PE2-RSYB5-DC-S018 (160-30233-18) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 08/17/2018, prepared on 08/20/2018 and analyzed on 09/10/2018 and 09/11/2018.

The cesium-137 detection goal of 0.0700 pCi/g was not met for samples PE2-RSYB5-DC-S002 (160-30233-2), PE2-RSYB5-DC-S003 (160-30233-3), PE2-RSYB5-DC-S009 (160-30233-9) and PE2-RSYB5-DC-S010 (160-30233-10) in batch 160-384135. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# CHAIN OF CUSTODY

APTIM Federal Services, LLC  
4005 Port Chicago Hwy  
Concord, CA 94520

Project Number: 500506

CTO-013 RSYB5 Deconstruction

Project Name: Systematic

Project Location: HPNS - Parcel E-2

Purchase Order #: 202296

Shipment/Pickup Date: 8.16.18

Waybill Number: 126615451392166416

Lab Destination: TestAmerica (St. Louis Lab)

13715 Rider Trail North

Earth City, MO 63045

Lab Contact Name / ph. #: Rhonda Ridenhower (314) 298-8566

Preservative (Water)

Collection Information

Date

Time

Method

Matrx

# of Containers

Container Type

Preservative (soil)

N/A

1 2 3 4 5 6 7 8 9 10 11 12

		Analyses Requested			
		Strontium 90 (EPA 905 MOD)		Gamma Spec (EPA 191.1 M)	
		Total Strontium (EPA 905 MOD)		(7 day in-growth preliminary results and fall 21 day in-growth for full gamma results)	
Shipment/Pickup Date:	8.16.18	Preservative (Water)	Preservative (soil)	Preservative (soil)	Dose Rate $\mu\text{R}/\text{hr}$
Waiver Number:	126615451392166416				
Lab Destination:	TestAmerica (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63045				
Lab Contact Name / ph. #:	Rhonda Ridenhower (314) 298-8566				
Preservative (Water)					
Preservative (soil)					
Dose Rate $\mu\text{R}/\text{hr}$					



160-30233 Chain of Custody

Send Report To: Eddie Kalombo	Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy	City: Concord, CA, 94520
Sampler's Name(s): <u>Joaquin Ramirez</u>	Sample Description
Sample ID Number	Parcel E-2 RSYB5 Deconstruction Systematic
	8/14/18 1230 G SO 1 16 oz. plastic jar
	Parcel E-2 RSYB5 Deconstruction Systematic
	8/14/18 1237 G SO 1 16 oz. plastic jar
	Parcel E-2 RSYB5 Deconstruction Systematic
	8/14/18 1243 G SO 1 16 oz. plastic jar
	Parcel E-2 RSYB5 Deconstruction Systematic
	8/14/18 1240 G SO 1 16 oz. plastic jar
	Parcel E-2 RSYB5 Deconstruction Systematic
	8/14/18 1248 G SO 1 16 oz. plastic jar
	Parcel E-2 RSYB5 Deconstruction Systematic
	8/14/18 1254 G SO 1 16 oz. plastic jar
	Parcel E-2 RSYB5 Deconstruction Systematic
	8/14/18 1303 G SO 1 16 oz. plastic jar
	Parcel E-2 RSYB5 Deconstruction Systematic
	8/14/18 1310 G SO 1 16 oz. plastic jar
	Parcel E-2 RSYB5 Deconstruction Systematic
	8/14/18 1317 G SO 1 16 oz. plastic jar
	Parcel E-2 RSYB5 Deconstruction Systematic
	8/14/18 1324 G SO 1 16 oz. plastic jar

Special Instructions:  
  
Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g.

<input type="checkbox"/> 24-hr	<input type="checkbox"/> 3-day	<input type="checkbox"/> 10-day	<input type="checkbox"/> II	<input type="checkbox"/> III	Project Specific:
Standard TAT-10-day					
Relinquished By: <u>Joaquin Ramirez</u>	Date: 8.16.18	Received By: <u>Kathleen Bo</u>	Date: 8.16.18	Method Codes: 8-17-18	Matrix Codes: 0820
Time: 1600			Time: 1600	Time: 1600	Date: 8.16.18
Relinquished By: <u>Eduardo Kathleen Bo</u>	Date: 8.16.18	Received By: <u>Microbiology Henry</u>	Date: 8.16.18	Method Codes: 8-17-18	Matrix Codes: 0820
Time: 1600			Time: 1600	Time: 1600	Date: 8.16.18
Relinquished By:	Date:	Received By:	Date:	Method Codes:	Matrix Codes:
Time:				SO = Soil	DW = Drinking Water
Date:				SL = Sludge	GW = Ground Water
Time:				WW = Waste Water	CP = Chip Samples
A = Air				ABS = Asbestos	PC = Pipe Opening



## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-30233-2

**Login Number: 30233****List Source: TestAmerica St. Louis****List Number: 1****Creator: Press, Nicholas B**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Definitions/Glossary

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

### **Qualifiers**

#### **Rad**

<b>Qualifier</b>	<b>Qualifier Description</b>
U	Undetected at the Limit of Detection.

### **Glossary**

#### **Abbreviation** **These commonly used abbreviations may or may not be present in this report.**

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## Method Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

Method	Method Description	Protocol	Laboratory
905.0	Total Beta Strontium (GFPC)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

**Protocol References:**

DOE = U.S. Department of Energy

None = None

**Laboratory References:**

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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## Sample Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-30233-1	PE2-RSYB5-DC-S001	Solid	08/14/18 12:30	08/17/18 08:30
160-30233-2	PE2-RSYB5-DC-S002	Solid	08/14/18 12:37	08/17/18 08:30
160-30233-3	PE2-RSYB5-DC-S003	Solid	08/14/18 12:43	08/17/18 08:30
160-30233-4	PE2-RSYB5-DC-S004	Solid	08/14/18 12:40	08/17/18 08:30
160-30233-5	PE2-RSYB5-DC-S005	Solid	08/14/18 12:48	08/17/18 08:30
160-30233-6	PE2-RSYB5-DC-S006	Solid	08/14/18 12:56	08/17/18 08:30
160-30233-7	PE2-RSYB5-DC-S007	Solid	08/14/18 13:03	08/17/18 08:30
160-30233-8	PE2-RSYB5-DC-S008	Solid	08/14/18 13:10	08/17/18 08:30
160-30233-9	PE2-RSYB5-DC-S009	Solid	08/14/18 13:17	08/17/18 08:30
160-30233-10	PE2-RSYB5-DC-S010	Solid	08/14/18 13:24	08/17/18 08:30
160-30233-11	PE2-RSYB5-DC-S011	Solid	08/14/18 13:32	08/17/18 08:30
160-30233-12	PE2-RSYB5-DC-S012	Solid	08/14/18 13:39	08/17/18 08:30
160-30233-13	PE2-RSYB5-DC-S013	Solid	08/14/18 13:46	08/17/18 08:30
160-30233-14	PE2-RSYB5-DC-S014	Solid	08/14/18 13:53	08/17/18 08:30
160-30233-15	PE2-RSYB5-DC-S015	Solid	08/14/18 14:00	08/17/18 08:30
160-30233-16	PE2-RSYB5-DC-S016	Solid	08/14/18 14:07	08/17/18 08:30
160-30233-17	PE2-RSYB5-DC-S017	Solid	08/14/18 14:14	08/17/18 08:30
160-30233-18	PE2-RSYB5-DC-S018	Solid	08/14/18 14:21	08/17/18 08:30

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Client Sample ID: PE2-RSYB5-DC-S001****Lab Sample ID: 160-30233-1**

Date Collected: 08/14/18 12:30

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: 905.0 - Total Beta Strontium (GFPC)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
<b>Total Beta Strontium</b>	<b>0.0447</b>		0.0575	0.0576	0.331	0.0431	pCi/g	08/23/18 12:22	09/10/18 05:36	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	88.1		40 - 110					08/23/18 12:22	09/10/18 05:36	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
<b>Actinium 228</b>	<b>0.814</b>		0.195	0.212		0.0377	pCi/g	08/20/18 16:08	09/10/18 23:12	1
Actinium-227	0.156	U	0.691	0.691		0.424	pCi/g	08/20/18 16:08	09/10/18 23:12	1
Bismuth-212	0.282	U	1.35	1.35		1.09	pCi/g	08/20/18 16:08	09/10/18 23:12	1
<b>Bismuth-214</b>	<b>0.695</b>		0.164	0.179		0.0575	pCi/g	08/20/18 16:08	09/10/18 23:12	1
Cesium-137	0.0232	U	0.0687	0.0688	0.0700	0.0542	pCi/g	08/20/18 16:08	09/10/18 23:12	1
Cobalt-60	0.0275	U	0.0592	0.0593	0.200	0.0353	pCi/g	08/20/18 16:08	09/10/18 23:12	1
Lead-210	1.09	U	2.01	2.01		1.27	pCi/g	08/20/18 16:08	09/10/18 23:12	1
<b>Lead-212</b>	<b>0.511</b>		0.116	0.127		0.0604	pCi/g	08/20/18 16:08	09/10/18 23:12	1
<b>Lead-214</b>	<b>0.597</b>		0.137	0.150		0.0707	pCi/g	08/20/18 16:08	09/10/18 23:12	1
<b>Potassium-40</b>	<b>10.8</b>		1.73	2.04		0.417	pCi/g	08/20/18 16:08	09/10/18 23:12	1
Protactinium-231	0.958	U	2.38	2.38		2.58	pCi/g	08/20/18 16:08	09/10/18 23:12	1
<b>Radium-226</b>	<b>0.695</b>		0.164	0.179	0.700	0.0575	pCi/g	08/20/18 16:08	09/10/18 23:12	1
<b>Radium-228</b>	<b>0.814</b>		0.195	0.212		0.0377	pCi/g	08/20/18 16:08	09/10/18 23:12	1
<b>Thallium-208</b>	<b>0.195</b>		0.0711	0.0738		0.0309	pCi/g	08/20/18 16:08	09/10/18 23:12	1
<b>Thorium-228</b>	<b>0.511</b>		0.116	0.127		0.0604	pCi/g	08/20/18 16:08	09/10/18 23:12	1
<b>Thorium-232</b>	<b>0.814</b>		0.195	0.212		0.0377	pCi/g	08/20/18 16:08	09/10/18 23:12	1
Thorium-234	-0.948	U	0.808	0.815		1.48	pCi/g	08/20/18 16:08	09/10/18 23:12	1
Uranium-235	-0.104	U	0.260	0.260		0.613	pCi/g	08/20/18 16:08	09/10/18 23:12	1
Uranium-238	-0.948	U	0.808	0.815		1.48	pCi/g	08/20/18 16:08	09/10/18 23:12	1

**Client Sample ID: PE2-RSYB5-DC-S002****Lab Sample ID: 160-30233-2**

Date Collected: 08/14/18 12:37

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
<b>Actinium 228</b>	<b>0.628</b>		0.152	0.165		0.0379	pCi/g	08/20/18 16:08	09/11/18 03:32	1
Actinium-227	0.0546	U	0.608	0.608		0.376	pCi/g	08/20/18 16:08	09/11/18 03:32	1
Bismuth-212	0.361	U	0.862	0.863		0.674	pCi/g	08/20/18 16:08	09/11/18 03:32	1
<b>Bismuth-214</b>	<b>0.437</b>		0.139	0.146		0.0515	pCi/g	08/20/18 16:08	09/11/18 03:32	1
Cesium-137	-0.0146	U	0.0846	0.0846	0.0700	0.0707	pCi/g	08/20/18 16:08	09/11/18 03:32	1
Cobalt-60	0.0174	U	0.0346	0.0346	0.200	0.0494	pCi/g	08/20/18 16:08	09/11/18 03:32	1
<b>Lead-210</b>	<b>0.972</b>		1.37	1.38		0.927	pCi/g	08/20/18 16:08	09/11/18 03:32	1
<b>Lead-212</b>	<b>0.485</b>		0.0984	0.117		0.0429	pCi/g	08/20/18 16:08	09/11/18 03:32	1
<b>Lead-214</b>	<b>0.605</b>		0.132	0.146		0.0552	pCi/g	08/20/18 16:08	09/11/18 03:32	1
<b>Potassium-40</b>	<b>8.93</b>		1.58	1.83		0.310	pCi/g	08/20/18 16:08	09/11/18 03:32	1
Protactinium-231	0.378	U	1.45	1.45		2.28	pCi/g	08/20/18 16:08	09/11/18 03:32	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Client Sample ID: PE2-RSYB5-DC-S002****Lab Sample ID: 160-30233-2**

Date Collected: 08/14/18 12:37

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	0.437		0.139	0.146	0.700	0.0515	pCi/g	08/20/18 16:08	09/11/18 03:32	1
Radium-228	0.628		0.152	0.165		0.0379	pCi/g	08/20/18 16:08	09/11/18 03:32	1
Thallium-208	0.136		0.120	0.120		0.0506	pCi/g	08/20/18 16:08	09/11/18 03:32	1
Thorium-228	0.485		0.0984	0.117		0.0429	pCi/g	08/20/18 16:08	09/11/18 03:32	1
<b>Thorium-232</b>	<b>0.628</b>		0.152	0.165		0.0379	pCi/g	08/20/18 16:08	09/11/18 03:32	1
Thorium-234	0.0434 U		0.525	0.525		0.428	pCi/g	08/20/18 16:08	09/11/18 03:32	1
Uranium-235	-0.00512 U		0.0182	0.0182		0.321	pCi/g	08/20/18 16:08	09/11/18 03:32	1
Uranium-238	0.0434 U		0.525	0.525		0.428	pCi/g	08/20/18 16:08	09/11/18 03:32	1

**Client Sample ID: PE2-RSYB5-DC-S003****Lab Sample ID: 160-30233-3**

Date Collected: 08/14/18 12:43

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.852</b>		0.263	0.277		0.0473	pCi/g	08/20/18 16:08	09/11/18 03:31	1
Actinium-227	-0.421 U		0.946	0.948		0.624	pCi/g	08/20/18 16:08	09/11/18 03:31	1
Bismuth-212	0.159 U		1.09	1.09		0.883	pCi/g	08/20/18 16:08	09/11/18 03:31	1
<b>Bismuth-214</b>	<b>0.707</b>		0.192	0.206		0.0621	pCi/g	08/20/18 16:08	09/11/18 03:31	1
Cesium-137	0.0309 U		0.113	0.113	0.0700	0.0903	pCi/g	08/20/18 16:08	09/11/18 03:31	1
Cobalt-60	-0.0666 U		0.184	0.184	0.200	0.0832	pCi/g	08/20/18 16:08	09/11/18 03:31	1
Lead-210	-0.171 U		1.97	1.98		2.05	pCi/g	08/20/18 16:08	09/11/18 03:31	1
<b>Lead-212</b>	<b>0.865</b>		0.145	0.183		0.0577	pCi/g	08/20/18 16:08	09/11/18 03:31	1
<b>Lead-214</b>	<b>0.876</b>		0.221	0.239		0.0794	pCi/g	08/20/18 16:08	09/11/18 03:31	1
<b>Potassium-40</b>	<b>13.6</b>		2.17	2.58		0.377	pCi/g	08/20/18 16:08	09/11/18 03:31	1
Protactinium-231	0.000 U		0.332	0.332		3.05	pCi/g	08/20/18 16:08	09/11/18 03:31	1
<b>Radium-226</b>	<b>0.707</b>		0.192	0.206	0.700	0.0621	pCi/g	08/20/18 16:08	09/11/18 03:31	1
Radium-228	0.852		0.263	0.277		0.0473	pCi/g	08/20/18 16:08	09/11/18 03:31	1
Thallium-208	0.234		0.0733	0.0773		0.0229	pCi/g	08/20/18 16:08	09/11/18 03:31	1
Thorium-228	0.865		0.145	0.183		0.0577	pCi/g	08/20/18 16:08	09/11/18 03:31	1
<b>Thorium-232</b>	<b>0.852</b>		0.263	0.277		0.0473	pCi/g	08/20/18 16:08	09/11/18 03:31	1
Thorium-234	0.578 U		0.694	0.697		0.670	pCi/g	08/20/18 16:08	09/11/18 03:31	1
Uranium-235	-0.114 U		0.215	0.215		0.589	pCi/g	08/20/18 16:08	09/11/18 03:31	1
Uranium-238	0.578 U		0.694	0.697		0.670	pCi/g	08/20/18 16:08	09/11/18 03:31	1

**Client Sample ID: PE2-RSYB5-DC-S004****Lab Sample ID: 160-30233-4**

Date Collected: 08/14/18 12:40

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.732</b>		0.143	0.162		0.0609	pCi/g	08/20/18 16:08	09/11/18 04:08	1
Actinium-227	-0.403 U		0.775	0.776		0.452	pCi/g	08/20/18 16:08	09/11/18 04:08	1
<b>Bismuth-212</b>	<b>1.22</b>		0.483	0.499		0.172	pCi/g	08/20/18 16:08	09/11/18 04:08	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Client Sample ID: PE2-RSYB5-DC-S004**

Date Collected: 08/14/18 12:40

Date Received: 08/17/18 08:30

**Lab Sample ID: 160-30233-4**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Bismuth-214	2.03		0.208	0.296		0.0500	pCi/g	08/20/18 16:08	09/11/18 04:08	1
Cesium-137	0.00201	U	0.0624	0.0624	0.0700	0.0513	pCi/g	08/20/18 16:08	09/11/18 04:08	1
Cobalt-60	0.0161	U	0.0309	0.0309	0.200	0.0440	pCi/g	08/20/18 16:08	09/11/18 04:08	1
Lead-210	-0.618	U	1.50	1.50		1.56	pCi/g	08/20/18 16:08	09/11/18 04:08	1
<b>Lead-212</b>	<b>0.778</b>		0.101	0.143		0.0457	pCi/g	08/20/18 16:08	09/11/18 04:08	1
<b>Lead-214</b>	<b>2.12</b>		0.165	0.275		0.0652	pCi/g	08/20/18 16:08	09/11/18 04:08	1
<b>Potassium-40</b>	<b>16.8</b>		1.57	2.33		0.223	pCi/g	08/20/18 16:08	09/11/18 04:08	1
Protactinium-231	0.000	U	0.399	0.399		2.81	pCi/g	08/20/18 16:08	09/11/18 04:08	1
<b>Radium-226</b>	<b>2.03</b>		0.208	0.296	0.700	0.0500	pCi/g	08/20/18 16:08	09/11/18 04:08	1
<b>Radium-228</b>	<b>0.732</b>		0.143	0.162		0.0609	pCi/g	08/20/18 16:08	09/11/18 04:08	1
<b>Thallium-208</b>	<b>0.262</b>		0.0637	0.0693		0.0229	pCi/g	08/20/18 16:08	09/11/18 04:08	1
<b>Thorium-228</b>	<b>0.778</b>		0.101	0.143		0.0457	pCi/g	08/20/18 16:08	09/11/18 04:08	1
<b>Thorium-232</b>	<b>0.732</b>		0.143	0.162		0.0609	pCi/g	08/20/18 16:08	09/11/18 04:08	1
Thorium-234	0.00599	U	0.0117	0.0117		1.23	pCi/g	08/20/18 16:08	09/11/18 04:08	1
Uranium-235	-0.205	U	0.791	0.791		0.452	pCi/g	08/20/18 16:08	09/11/18 04:08	1
Uranium-238	0.00599	U	0.0117	0.0117		1.23	pCi/g	08/20/18 16:08	09/11/18 04:08	1

**Client Sample ID: PE2-RSYB5-DC-S005**

Date Collected: 08/14/18 12:48

Date Received: 08/17/18 08:30

**Lab Sample ID: 160-30233-5**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.700		0.227	0.238		0.181	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Actinium-227	-0.366	U	0.732	0.733		0.442	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Bismuth-212	0.391	U	0.683	0.684		0.520	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Bismuth-214</b>	<b>0.585</b>		0.132	0.145		0.0455	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Cesium-137	-0.0439	U	0.0756	0.0757	0.0700	0.0588	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Cobalt-60</b>	<b>0.0656</b>		0.0364	0.0370	0.200	0.0118	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Lead-210</b>	<b>1.21</b>		1.55	1.56		1.01	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Lead-212</b>	<b>0.720</b>		0.114	0.136		0.0488	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Lead-214</b>	<b>0.694</b>		0.204	0.216		0.0938	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Potassium-40</b>	<b>14.3</b>		1.70	2.23		0.118	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Protactinium-231	-0.924	U	2.89	2.89		2.35	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Radium-226</b>	<b>0.585</b>		0.132	0.145	0.700	0.0455	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Radium-228</b>	<b>0.700</b>		0.227	0.238		0.181	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Thallium-208</b>	<b>0.253</b>		0.0729	0.0773		0.0285	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Thorium-228</b>	<b>0.720</b>		0.114	0.136		0.0488	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Thorium-232</b>	<b>0.700</b>		0.227	0.238		0.181	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Thorium-234	-0.702	U	0.755	0.759		1.05	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Uranium-235	0.000	U	0.211	0.211		0.522	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Uranium-238	-0.702	U	0.755	0.759		1.05	pCi/g	08/20/18 16:08	09/11/18 04:12	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Client Sample ID: PE2-RSYB5-DC-S006**

Date Collected: 08/14/18 12:56

Date Received: 08/17/18 08:30

**Lab Sample ID: 160-30233-6**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.520</b>		0.151	0.160		0.0967	pCi/g	08/20/18 16:08	09/11/18 04:13	1
Actinium-227	0.178	U	0.500	0.501		0.319	pCi/g	08/20/18 16:08	09/11/18 04:13	1
Bismuth-212	-0.0143	U	0.765	0.765		0.651	pCi/g	08/20/18 16:08	09/11/18 04:13	1
<b>Bismuth-214</b>	<b>0.512</b>		0.148	0.157		0.0559	pCi/g	08/20/18 16:08	09/11/18 04:13	1
Cesium-137	-0.000510	U	0.0855	0.0855	0.0700	0.0513	pCi/g	08/20/18 16:08	09/11/18 04:13	1
Cobalt-60	0.00897	U	0.0582	0.0582	0.200	0.0289	pCi/g	08/20/18 16:08	09/11/18 04:13	1
Lead-210	-0.202	U	1.35	1.35		0.971	pCi/g	08/20/18 16:08	09/11/18 04:13	1
<b>Lead-212</b>	<b>0.503</b>		0.0952	0.115		0.0428	pCi/g	08/20/18 16:08	09/11/18 04:13	1
<b>Lead-214</b>	<b>0.589</b>		0.124	0.138		0.0578	pCi/g	08/20/18 16:08	09/11/18 04:13	1
<b>Potassium-40</b>	<b>9.97</b>		1.50	1.82		0.245	pCi/g	08/20/18 16:08	09/11/18 04:13	1
Protactinium-231	0.283	U	1.25	1.25		1.98	pCi/g	08/20/18 16:08	09/11/18 04:13	1
<b>Radium-226</b>	<b>0.512</b>		0.148	0.157	0.700	0.0559	pCi/g	08/20/18 16:08	09/11/18 04:13	1
<b>Radium-228</b>	<b>0.520</b>		0.151	0.160		0.0967	pCi/g	08/20/18 16:08	09/11/18 04:13	1
<b>Thallium-208</b>	<b>0.185</b>		0.0639	0.0667		0.0243	pCi/g	08/20/18 16:08	09/11/18 04:13	1
<b>Thorium-228</b>	<b>0.503</b>		0.0952	0.115		0.0428	pCi/g	08/20/18 16:08	09/11/18 04:13	1
<b>Thorium-232</b>	<b>0.520</b>		0.151	0.160		0.0967	pCi/g	08/20/18 16:08	09/11/18 04:13	1
Thorium-234	0.190	U	0.447	0.448		0.350	pCi/g	08/20/18 16:08	09/11/18 04:13	1
Uranium-235	-0.00933	U	0.301	0.301		0.281	pCi/g	08/20/18 16:08	09/11/18 04:13	1
Uranium-238	0.190	U	0.447	0.448		0.350	pCi/g	08/20/18 16:08	09/11/18 04:13	1

**Client Sample ID: PE2-RSYB5-DC-S007**

Date Collected: 08/14/18 13:03

Date Received: 08/17/18 08:30

**Lab Sample ID: 160-30233-7**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.827</b>		0.227	0.242		0.0363	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Actinium-227	0.290	U	0.514	0.515		0.310	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Bismuth-212	0.327	U	0.698	0.699		0.535	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Bismuth-214</b>	<b>0.663</b>		0.145	0.161		0.0404	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Cesium-137	0.0317	U	0.0716	0.0716	0.0700	0.0559	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Cobalt-60	0.0233	U	0.0485	0.0486	0.200	0.0363	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Lead-210	-0.0371	U	2.38	2.38		1.96	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Lead-212</b>	<b>0.524</b>		0.111	0.130		0.0570	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Lead-214</b>	<b>0.648</b>		0.157	0.170		0.0595	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Potassium-40</b>	<b>8.53</b>		1.52	1.76		0.294	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Protactinium-231	0.396	U	1.67	1.67		2.63	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Radium-226</b>	<b>0.663</b>		0.145	0.161	0.700	0.0404	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Radium-228</b>	<b>0.827</b>		0.227	0.242		0.0363	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Thallium-208</b>	<b>0.238</b>		0.0729	0.0770		0.0232	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Thorium-228</b>	<b>0.524</b>		0.111	0.130		0.0570	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Thorium-232</b>	<b>0.827</b>		0.227	0.242		0.0363	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Thorium-234</b>	<b>0.803</b>		0.521	0.528		0.442	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Uranium-235	0.0849	U	0.192	0.192		0.427	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Uranium-238</b>	<b>0.803</b>		0.521	0.528		0.442	pCi/g	08/20/18 16:08	09/11/18 04:15	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Client Sample ID: PE2-RSYB5-DC-S008**

Date Collected: 08/14/18 13:10

Date Received: 08/17/18 08:30

**Lab Sample ID: 160-30233-8**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.754</b>		0.257	0.268		0.0981	pCi/g	08/20/18 16:08	09/11/18 04:17	1
Actinium-227	0.146	U	0.323	0.323		0.336	pCi/g	08/20/18 16:08	09/11/18 04:17	1
Bismuth-212	-0.467	U	0.999	1.00		0.795	pCi/g	08/20/18 16:08	09/11/18 04:17	1
<b>Bismuth-214</b>	<b>0.553</b>		0.132	0.144		0.0497	pCi/g	08/20/18 16:08	09/11/18 04:17	1
Cesium-137	-0.00703	U	0.0600	0.0600	0.0700	0.0488	pCi/g	08/20/18 16:08	09/11/18 04:17	1
<b>Cobalt-60</b>	<b>0.0326</b>		0.0258	0.0260	0.200	0.0102	pCi/g	08/20/18 16:08	09/11/18 04:17	1
Lead-210	-0.544	U	1.58	1.58		1.15	pCi/g	08/20/18 16:08	09/11/18 04:17	1
<b>Lead-212</b>	<b>0.628</b>		0.105	0.133		0.0507	pCi/g	08/20/18 16:08	09/11/18 04:17	1
<b>Lead-214</b>	<b>0.577</b>		0.113	0.128		0.0570	pCi/g	08/20/18 16:08	09/11/18 04:17	1
<b>Potassium-40</b>	<b>13.7</b>		1.59	2.12		0.275	pCi/g	08/20/18 16:08	09/11/18 04:17	1
Protactinium-231	0.000	U	0.689	0.689		2.16	pCi/g	08/20/18 16:08	09/11/18 04:17	1
<b>Radium-226</b>	<b>0.553</b>		0.132	0.144	0.700	0.0497	pCi/g	08/20/18 16:08	09/11/18 04:17	1
<b>Radium-228</b>	<b>0.754</b>		0.257	0.268		0.0981	pCi/g	08/20/18 16:08	09/11/18 04:17	1
<b>Thallium-208</b>	<b>0.301</b>		0.0717	0.0782		0.0235	pCi/g	08/20/18 16:08	09/11/18 04:17	1
<b>Thorium-228</b>	<b>0.628</b>		0.105	0.133		0.0507	pCi/g	08/20/18 16:08	09/11/18 04:17	1
<b>Thorium-232</b>	<b>0.754</b>		0.257	0.268		0.0981	pCi/g	08/20/18 16:08	09/11/18 04:17	1
<b>Thorium-234</b>	<b>0.690</b>		0.645	0.649		0.430	pCi/g	08/20/18 16:08	09/11/18 04:17	1
Uranium-235	-0.144	U	0.341	0.341		0.357	pCi/g	08/20/18 16:08	09/11/18 04:17	1
<b>Uranium-238</b>	<b>0.690</b>		0.645	0.649		0.430	pCi/g	08/20/18 16:08	09/11/18 04:17	1

**Client Sample ID: PE2-RSYB5-DC-S009**

Date Collected: 08/14/18 13:17

Date Received: 08/17/18 08:30

**Lab Sample ID: 160-30233-9**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.852</b>		0.197	0.215		0.0715	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Actinium-227	-0.00883	U	0.0707	0.0707		0.493	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Bismuth-212	-0.0150	U	0.701	0.701		0.824	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Bismuth-214</b>	<b>0.660</b>		0.168	0.181		0.0654	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Cesium-137	-0.0485	U	0.0914	0.0915	0.0700	0.0716	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Cobalt-60	0.0158	U	0.0342	0.0342	0.200	0.0562	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Lead-210</b>	<b>1.51</b>		1.58	1.59		1.07	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Lead-212</b>	<b>0.637</b>		0.119	0.137		0.0580	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Lead-214</b>	<b>0.701</b>		0.156	0.172		0.0636	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Potassium-40</b>	<b>13.2</b>		1.82	2.26		0.388	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Protactinium-231	0.158	U	1.83	1.83		2.83	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Radium-226</b>	<b>0.660</b>		0.168	0.181	0.700	0.0654	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Radium-228</b>	<b>0.852</b>		0.197	0.215		0.0715	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Thallium-208</b>	<b>0.209</b>		0.0653	0.0687		0.0235	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Thorium-228</b>	<b>0.637</b>		0.119	0.137		0.0580	pCi/g	08/20/18 16:08	09/11/18 04:12	1
<b>Thorium-232</b>	<b>0.852</b>		0.197	0.215		0.0715	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Thorium-234	-0.707	U	0.861	0.864		1.47	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Uranium-235	0.146	U	0.311	0.311		0.531	pCi/g	08/20/18 16:08	09/11/18 04:12	1
Uranium-238	-0.707	U	0.861	0.864		1.47	pCi/g	08/20/18 16:08	09/11/18 04:12	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Client Sample ID: PE2-RSYB5-DC-S010****Lab Sample ID: 160-30233-10**

Date Collected: 08/14/18 13:24

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.644</b>		0.214	0.224		0.0695	pCi/g	08/20/18 16:08	09/11/18 04:14	1
Actinium-227	0.165	U	0.413	0.414		0.406	pCi/g	08/20/18 16:08	09/11/18 04:14	1
Bismuth-212	0.406	U	0.785	0.786		0.595	pCi/g	08/20/18 16:08	09/11/18 04:14	1
<b>Bismuth-214</b>	<b>0.694</b>		0.176	0.190		0.0524	pCi/g	08/20/18 16:08	09/11/18 04:14	1
Cesium-137	-0.0164	U	0.0970	0.0970	0.0700	0.0810	pCi/g	08/20/18 16:08	09/11/18 04:14	1
<b>Cobalt-60</b>	<b>0.0437</b>		0.0670	0.0671	0.200	0.0393	pCi/g	08/20/18 16:08	09/11/18 04:14	1
<b>Lead-210</b>	<b>1.89</b>		1.45	1.47		0.867	pCi/g	08/20/18 16:08	09/11/18 04:14	1
<b>Lead-212</b>	<b>0.615</b>		0.116	0.140		0.0487	pCi/g	08/20/18 16:08	09/11/18 04:14	1
<b>Lead-214</b>	<b>0.846</b>		0.170	0.191		0.0538	pCi/g	08/20/18 16:08	09/11/18 04:14	1
<b>Potassium-40</b>	<b>14.3</b>		2.10	2.56		0.349	pCi/g	08/20/18 16:08	09/11/18 04:14	1
Protactinium-231	-0.993	U	2.51	2.52		2.02	pCi/g	08/20/18 16:08	09/11/18 04:14	1
<b>Radium-226</b>	<b>0.694</b>		0.176	0.190	0.700	0.0524	pCi/g	08/20/18 16:08	09/11/18 04:14	1
<b>Radium-228</b>	<b>0.644</b>		0.214	0.224		0.0695	pCi/g	08/20/18 16:08	09/11/18 04:14	1
<b>Thallium-208</b>	<b>0.309</b>		0.0963	0.102		0.0307	pCi/g	08/20/18 16:08	09/11/18 04:14	1
<b>Thorium-228</b>	<b>0.615</b>		0.116	0.140		0.0487	pCi/g	08/20/18 16:08	09/11/18 04:14	1
<b>Thorium-232</b>	<b>0.644</b>		0.214	0.224		0.0695	pCi/g	08/20/18 16:08	09/11/18 04:14	1
Thorium-234	0.369	U	0.524	0.525		0.454	pCi/g	08/20/18 16:08	09/11/18 04:14	1
Uranium-235	0.105	U	0.371	0.371		0.301	pCi/g	08/20/18 16:08	09/11/18 04:14	1
Uranium-238	0.369	U	0.524	0.525		0.454	pCi/g	08/20/18 16:08	09/11/18 04:14	1

**Client Sample ID: PE2-RSYB5-DC-S011****Lab Sample ID: 160-30233-11**

Date Collected: 08/14/18 13:32

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: 905.0 - Total Beta Strontium (GFPC)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Total Beta Strontium</b>	<b>0.121</b>		0.0731	0.0736	0.331	0.0507	pCi/g	08/23/18 12:22	09/10/18 05:36	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	86.4		40 - 110					08/23/18 12:22	09/10/18 05:36	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.743</b>		0.179	0.194		0.0671	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Actinium-227	0.0212	U	0.653	0.653		0.387	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Bismuth-212	-0.434	U	0.691	0.692		0.767	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Bismuth-214</b>	<b>0.527</b>		0.126	0.137		0.0317	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Cesium-137	0.00662	U	0.0564	0.0565	0.0700	0.0453	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Cobalt-60</b>	<b>0.0292</b>		0.0409	0.0410	0.200	0.0251	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Lead-210	-0.458	U	1.39	1.39		1.38	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Lead-212</b>	<b>0.540</b>		0.100	0.122		0.0425	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Lead-214</b>	<b>0.770</b>		0.155	0.175		0.0495	pCi/g	08/20/18 16:08	09/11/18 04:15	1
<b>Potassium-40</b>	<b>9.33</b>		1.55	1.82		0.280	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Protactinium-231	0.000	U	0.174	0.174		2.36	pCi/g	08/20/18 16:08	09/11/18 04:15	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Client Sample ID: PE2-RSYB5-DC-S011****Lab Sample ID: 160-30233-11**

Date Collected: 08/14/18 13:32

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	0.527		0.126	0.137	0.700	0.0317	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Radium-228	0.743		0.179	0.194		0.0671	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Thallium-208	0.181		0.0601	0.0630		0.0220	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Thorium-228	0.540		0.100	0.122		0.0425	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Thorium-232	0.743		0.179	0.194		0.0671	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Thorium-234	0.546		0.597	0.600		0.460	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Uranium-235	-0.234	U	0.326	0.327		0.445	pCi/g	08/20/18 16:08	09/11/18 04:15	1
Uranium-238	0.546		0.597	0.600		0.460	pCi/g	08/20/18 16:08	09/11/18 04:15	1

**Client Sample ID: PE2-RSYB5-DC-S012****Lab Sample ID: 160-30233-12**

Date Collected: 08/14/18 13:39

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.809		0.151	0.172		0.0241	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Actinium-227	-0.0171	U	0.615	0.615		0.365	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Bismuth-212	-0.0463	U	0.734	0.734		0.601	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Bismuth-214</b>	<b>0.588</b>		0.127	0.141		0.0455	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Cesium-137	0.0364	U	0.0613	0.0614	0.0700	0.0477	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Cobalt-60	-0.0243	U	0.0810	0.0810	0.200	0.0390	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Lead-210	0.149	U	1.66	1.66		1.36	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Lead-212</b>	<b>0.706</b>		0.0985	0.134		0.0388	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Lead-214</b>	<b>0.739</b>		0.119	0.142		0.0488	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Potassium-40</b>	<b>13.3</b>		1.51	2.04		0.255	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Protactinium-231	0.000	U	0.373	0.373		2.24	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Radium-226</b>	<b>0.588</b>		0.127	0.141	0.700	0.0455	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Radium-228	0.809		0.151	0.172		0.0241	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Thallium-208	0.242		0.0549	0.0603		0.0159	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Thorium-228	0.706		0.0985	0.134		0.0388	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Thorium-232	0.809		0.151	0.172		0.0241	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Thorium-234	-0.408	U	1.43	1.43		1.17	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Uranium-235	0.180	U	0.338	0.339		0.240	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Uranium-238	-0.408	U	1.43	1.43		1.17	pCi/g	08/20/18 16:08	09/11/18 06:05	1

**Client Sample ID: PE2-RSYB5-DC-S013****Lab Sample ID: 160-30233-13**

Date Collected: 08/14/18 13:46

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.573		0.309	0.314		0.136	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Actinium-227	0.0560	U	0.724	0.724		0.449	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Bismuth-212	-0.501	U	1.01	1.01		0.798	pCi/g	08/20/18 16:08	09/11/18 06:06	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Client Sample ID: PE2-RSYB5-DC-S013****Lab Sample ID: 160-30233-13**

Date Collected: 08/14/18 13:46

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Bismuth-214	0.721		0.140	0.158		0.0254	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Cesium-137	0.0251	U	0.0442	0.0443	0.0700	0.0329	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Cobalt-60	-0.00699	U	0.0345	0.0345	0.200	0.0481	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Lead-210	0.236	U	1.30	1.30		1.05	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Lead-212</b>	<b>0.677</b>		0.115	0.135		0.0552	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Lead-214</b>	<b>0.704</b>		0.134	0.151		0.0700	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Potassium-40</b>	<b>14.2</b>		1.69	2.22		0.118	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Protactinium-231	-1.02	U	3.56	3.56		2.91	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Radium-226</b>	<b>0.721</b>		0.140	0.158	0.700	0.0254	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Radium-228</b>	<b>0.573</b>		0.309	0.314		0.136	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Thallium-208</b>	<b>0.267</b>		0.0678	0.0730		0.0226	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Thorium-228</b>	<b>0.677</b>		0.115	0.135		0.0552	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Thorium-232</b>	<b>0.573</b>		0.309	0.314		0.136	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Thorium-234</b>	<b>0.851</b>		0.600	0.607		0.482	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Uranium-235	0.154	U	0.353	0.354		0.515	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Uranium-238	0.851		0.600	0.607		0.482	pCi/g	08/20/18 16:08	09/11/18 06:06	1

**Client Sample ID: PE2-RSYB5-DC-S014****Lab Sample ID: 160-30233-14**

Date Collected: 08/14/18 13:53

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.894		0.209	0.228		0.0279	pCi/g	08/20/18 16:08	09/11/18 06:03	1
Actinium-227	-0.339	U	0.481	0.483		0.410	pCi/g	08/20/18 16:08	09/11/18 06:03	1
Bismuth-212	0.256	U	0.657	0.657		0.515	pCi/g	08/20/18 16:08	09/11/18 06:03	1
<b>Bismuth-214</b>	<b>0.702</b>		0.146	0.163		0.0476	pCi/g	08/20/18 16:08	09/11/18 06:03	1
Cesium-137	-0.0258	U	0.0845	0.0845	0.0700	0.0482	pCi/g	08/20/18 16:08	09/11/18 06:03	1
<b>Cobalt-60</b>	<b>0.0535</b>		0.0344	0.0348	0.200	0.0255	pCi/g	08/20/18 16:08	09/11/18 06:03	1
<b>Lead-210</b>	<b>1.35</b>		1.14	1.15		0.732	pCi/g	08/20/18 16:08	09/11/18 06:03	1
<b>Lead-212</b>	<b>0.720</b>		0.112	0.145		0.0550	pCi/g	08/20/18 16:08	09/11/18 06:03	1
<b>Lead-214</b>	<b>0.678</b>		0.130	0.148		0.0731	pCi/g	08/20/18 16:08	09/11/18 06:03	1
<b>Potassium-40</b>	<b>15.2</b>		1.73	2.33		0.216	pCi/g	08/20/18 16:08	09/11/18 06:03	1
Protactinium-231	0.703	U	2.58	2.58		2.10	pCi/g	08/20/18 16:08	09/11/18 06:03	1
<b>Radium-226</b>	<b>0.702</b>		0.146	0.163	0.700	0.0476	pCi/g	08/20/18 16:08	09/11/18 06:03	1
<b>Radium-228</b>	<b>0.894</b>		0.209	0.228		0.0279	pCi/g	08/20/18 16:08	09/11/18 06:03	1
<b>Thallium-208</b>	<b>0.235</b>		0.0647	0.0691		0.0242	pCi/g	08/20/18 16:08	09/11/18 06:03	1
<b>Thorium-228</b>	<b>0.720</b>		0.112	0.145		0.0550	pCi/g	08/20/18 16:08	09/11/18 06:03	1
<b>Thorium-232</b>	<b>0.894</b>		0.209	0.228		0.0279	pCi/g	08/20/18 16:08	09/11/18 06:03	1
Thorium-234	0.325	U	0.417	0.419		0.853	pCi/g	08/20/18 16:08	09/11/18 06:03	1
Uranium-235	0.0495	U	0.404	0.404		0.316	pCi/g	08/20/18 16:08	09/11/18 06:03	1
Uranium-238	0.325	U	0.417	0.419		0.853	pCi/g	08/20/18 16:08	09/11/18 06:03	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Client Sample ID: PE2-RSYB5-DC-S015****Lab Sample ID: 160-30233-15**

Date Collected: 08/14/18 14:00

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.731</b>		0.277	0.287		0.152	pCi/g	08/20/18 16:08	09/11/18 06:04	1
Actinium-227	0.227	U	0.459	0.459		0.347	pCi/g	08/20/18 16:08	09/11/18 06:04	1
Bismuth-212	-0.333	U	0.719	0.720		0.791	pCi/g	08/20/18 16:08	09/11/18 06:04	1
<b>Bismuth-214</b>	<b>0.648</b>		0.180	0.192		0.0690	pCi/g	08/20/18 16:08	09/11/18 06:04	1
Cesium-137	0.0312	U	0.0575	0.0576	0.0700	0.0442	pCi/g	08/20/18 16:08	09/11/18 06:04	1
<b>Cobalt-60</b>	<b>0.0434</b>		0.0332	0.0334	0.200	0.0123	pCi/g	08/20/18 16:08	09/11/18 06:04	1
Lead-210	-0.761	U	1.57	1.57		1.63	pCi/g	08/20/18 16:08	09/11/18 06:04	1
<b>Lead-212</b>	<b>0.591</b>		0.113	0.137		0.0626	pCi/g	08/20/18 16:08	09/11/18 06:04	1
<b>Lead-214</b>	<b>0.631</b>		0.152	0.166		0.0640	pCi/g	08/20/18 16:08	09/11/18 06:04	1
<b>Potassium-40</b>	<b>15.2</b>		1.83	2.40		0.246	pCi/g	08/20/18 16:08	09/11/18 06:04	1
Protactinium-231	0.000	U	0.339	0.339		2.53	pCi/g	08/20/18 16:08	09/11/18 06:04	1
<b>Radium-226</b>	<b>0.648</b>		0.180	0.192	0.700	0.0690	pCi/g	08/20/18 16:08	09/11/18 06:04	1
<b>Radium-228</b>	<b>0.731</b>		0.277	0.287		0.152	pCi/g	08/20/18 16:08	09/11/18 06:04	1
<b>Thallium-208</b>	<b>0.253</b>		0.0669	0.0718		0.0214	pCi/g	08/20/18 16:08	09/11/18 06:04	1
<b>Thorium-228</b>	<b>0.591</b>		0.113	0.137		0.0626	pCi/g	08/20/18 16:08	09/11/18 06:04	1
<b>Thorium-232</b>	<b>0.731</b>		0.277	0.287		0.152	pCi/g	08/20/18 16:08	09/11/18 06:04	1
<b>Thorium-234</b>	<b>0.878</b>		0.561	0.569		0.405	pCi/g	08/20/18 16:08	09/11/18 06:04	1
Uranium-235	0.137	U	0.500	0.500		0.446	pCi/g	08/20/18 16:08	09/11/18 06:04	1
<b>Uranium-238</b>	<b>0.878</b>		0.561	0.569		0.405	pCi/g	08/20/18 16:08	09/11/18 06:04	1

**Client Sample ID: PE2-RSYB5-DC-S016****Lab Sample ID: 160-30233-16**

Date Collected: 08/14/18 14:07

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.716</b>		0.219	0.231		0.135	pCi/g	08/20/18 16:08	09/11/18 06:07	1
Actinium-227	-0.328	U	0.652	0.653		0.414	pCi/g	08/20/18 16:08	09/11/18 06:07	1
Bismuth-212	0.326	U	0.681	0.681		0.529	pCi/g	08/20/18 16:08	09/11/18 06:07	1
<b>Bismuth-214</b>	<b>0.659</b>		0.163	0.177		0.0654	pCi/g	08/20/18 16:08	09/11/18 06:07	1
Cesium-137	0.0375	U	0.0712	0.0713	0.0700	0.0558	pCi/g	08/20/18 16:08	09/11/18 06:07	1
Cobalt-60	-0.0758	U	0.0527	0.0533	0.200	0.0616	pCi/g	08/20/18 16:08	09/11/18 06:07	1
Lead-210	0.377	U	1.43	1.43		0.998	pCi/g	08/20/18 16:08	09/11/18 06:07	1
<b>Lead-212</b>	<b>0.600</b>		0.111	0.136		0.0582	pCi/g	08/20/18 16:08	09/11/18 06:07	1
<b>Lead-214</b>	<b>0.601</b>		0.120	0.135		0.0577	pCi/g	08/20/18 16:08	09/11/18 06:07	1
<b>Potassium-40</b>	<b>10.2</b>		1.43	1.77		0.293	pCi/g	08/20/18 16:08	09/11/18 06:07	1
Protactinium-231	0.767	U	1.93	1.93		2.11	pCi/g	08/20/18 16:08	09/11/18 06:07	1
<b>Radium-226</b>	<b>0.659</b>		0.163	0.177	0.700	0.0654	pCi/g	08/20/18 16:08	09/11/18 06:07	1
<b>Radium-228</b>	<b>0.716</b>		0.219	0.231		0.135	pCi/g	08/20/18 16:08	09/11/18 06:07	1
<b>Thallium-208</b>	<b>0.295</b>		0.0748	0.0808		0.0269	pCi/g	08/20/18 16:08	09/11/18 06:07	1
<b>Thorium-228</b>	<b>0.600</b>		0.111	0.136		0.0582	pCi/g	08/20/18 16:08	09/11/18 06:07	1
<b>Thorium-232</b>	<b>0.716</b>		0.219	0.231		0.135	pCi/g	08/20/18 16:08	09/11/18 06:07	1
<b>Thorium-234</b>	<b>0.731</b>		0.737	0.742		0.488	pCi/g	08/20/18 16:08	09/11/18 06:07	1
Uranium-235	0.0932	U	0.390	0.391		0.317	pCi/g	08/20/18 16:08	09/11/18 06:07	1
<b>Uranium-238</b>	<b>0.731</b>		0.737	0.742		0.488	pCi/g	08/20/18 16:08	09/11/18 06:07	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Client Sample ID: PE2-RSYB5-DC-S017****Lab Sample ID: 160-30233-17**

Date Collected: 08/14/18 14:14

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.888</b>		0.191	0.211		0.0630	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Actinium-227	-0.457	U	0.756	0.758		0.513	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Bismuth-212</b>	<b>1.82</b>		0.584	0.613		0.107	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Bismuth-214</b>	<b>0.673</b>		0.154	0.168		0.0617	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Cesium-137	-0.0430	U	0.0836	0.0837	0.0700	0.0655	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Cobalt-60	-0.0919	U	0.165	0.165	0.200	0.0745	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Lead-210</b>	<b>1.35</b>		1.84	1.85		1.17	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Lead-212</b>	<b>0.613</b>		0.116	0.132		0.0582	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Lead-214</b>	<b>0.672</b>		0.148	0.163		0.0576	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Potassium-40</b>	<b>14.8</b>		1.86	2.39		0.364	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Protactinium-231	0.000	U	0.880	0.880		2.77	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Radium-226</b>	<b>0.673</b>		0.154	0.168	0.700	0.0617	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Radium-228</b>	<b>0.888</b>		0.191	0.211		0.0630	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Thallium-208</b>	<b>0.250</b>		0.0869	0.0905		0.0345	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Thorium-228</b>	<b>0.613</b>		0.116	0.132		0.0582	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Thorium-232</b>	<b>0.888</b>		0.191	0.211		0.0630	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Thorium-234</b>	<b>0.837</b>		0.631	0.638		0.516	pCi/g	08/20/18 16:08	09/11/18 06:05	1
Uranium-235	0.0785	U	0.262	0.262		0.578	pCi/g	08/20/18 16:08	09/11/18 06:05	1
<b>Uranium-238</b>	<b>0.837</b>		0.631	0.638		0.516	pCi/g	08/20/18 16:08	09/11/18 06:05	1

**Client Sample ID: PE2-RSYB5-DC-S018****Lab Sample ID: 160-30233-18**

Date Collected: 08/14/18 14:21

Matrix: Solid

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.601</b>		0.219	0.227		0.0633	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Actinium-227	0.0484	U	0.0700	0.0702		0.447	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Bismuth-212	0.299	U	0.773	0.774		0.607	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Bismuth-214</b>	<b>0.507</b>		0.140	0.150		0.0527	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Cesium-137	0.0122	U	0.0677	0.0677	0.0700	0.0543	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Cobalt-60	0.0181	U	0.0918	0.0919	0.200	0.0494	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Lead-210	0.327	U	1.88	1.88		1.54	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Lead-212</b>	<b>0.577</b>		0.104	0.128		0.0477	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Lead-214</b>	<b>0.578</b>		0.107	0.122		0.0457	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Potassium-40</b>	<b>14.4</b>		1.86	2.37		0.264	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Protactinium-231	0.000	U	0.434	0.434		2.44	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Radium-226</b>	<b>0.507</b>		0.140	0.150	0.700	0.0527	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Radium-228</b>	<b>0.601</b>		0.219	0.227		0.0633	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Thallium-208</b>	<b>0.180</b>		0.0653	0.0679		0.0279	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Thorium-228</b>	<b>0.577</b>		0.104	0.128		0.0477	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Thorium-232</b>	<b>0.601</b>		0.219	0.227		0.0633	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Thorium-234</b>	<b>0.850</b>		0.715	0.721		0.488	pCi/g	08/20/18 16:08	09/11/18 06:06	1
Uranium-235	-0.281	U	0.333	0.334		0.518	pCi/g	08/20/18 16:08	09/11/18 06:06	1
<b>Uranium-238</b>	<b>0.850</b>		0.715	0.721		0.488	pCi/g	08/20/18 16:08	09/11/18 06:06	1

# QC Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

## Method: 905.0 - Total Beta Strontium (GFPC)

Lab Sample ID: MB 160-384836/13-A

Matrix: Solid

Analysis Batch: 388155

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 384836

Analyte	Result	MB MB U	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.03994	U	0.0570	0.0570	0.331	0.0428	pCi/g	08/23/18 12:22	09/10/18 05:36	1
<i>Carrier</i>										
Sr Carrier	84.7			40 - 110						

Lab Sample ID: LCS 160-384836/1-A

Matrix: Solid

Analysis Batch: 388155

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 384836

Analyte	Spike Added	LCS Result	LCS Qual	Total	LOQ	DLC	Unit	%Rec	Limits	%Rec.
				Uncert. (2σ+/-)						
Total Beta Strontium	8.19	7.963		0.645	0.331	0.0504	pCi/g	97	75 - 125	
<i>Carrier</i>										
Sr Carrier	86.7		40 - 110							

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-384135/1-A

Matrix: Solid

Analysis Batch: 388150

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 384135

Analyte	Result	MB MB U	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.06036	U	0.148	0.148		0.118	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Actinium-227	-0.3688	U	0.795	0.797		0.475	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Bismuth-212	-0.4593	U	1.07	1.07		0.829	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Bismuth-214	0.01509	U	0.179	0.179		0.146	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Cesium-137	0.001817	U	0.0629	0.0629	0.0700	0.0511	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Cobalt-60	-0.01247	U	0.101	0.101	0.200	0.0503	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Lead-210	0.7102	U	1.11	1.11		0.767	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Lead-212	-0.02045	U	0.118	0.118		0.0895	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Lead-214	-0.1212	U	0.115	0.116		0.128	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Potassium-40	-0.7039	U	0.785	0.788		0.678	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Protactinium-231	0.0000	U	0.376	0.376		2.59	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Radium-226	0.01509	U	0.179	0.179	0.700	0.146	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Radium-228	0.06036	U	0.148	0.148		0.118	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Thallium-208	0.02562	U	0.0188	0.0190		0.0446	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Thorium-228	-0.02045	U	0.118	0.118		0.0895	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Thorium-232	0.06036	U	0.148	0.148		0.118	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Thorium-234	0.2676	U	0.366	0.367		0.357	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Uranium-235	-0.1399	U	0.306	0.306		0.286	pCi/g	08/20/18 16:08	09/10/18 23:15	1
Uranium-238	0.2676	U	0.366	0.367		0.357	pCi/g	08/20/18 16:08	09/10/18 23:15	1

# QC Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-384135/2-A

Matrix: Solid

Analysis Batch: 388149

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 384135

Analyte	Spike Added	LCS		Total		LOQ	DLC	Unit	%Rec	%Rec. Limits
		Result	Qual	Uncert. (2σ+/-)						
Americium-241	96.8	101.9		10.7		0.560	pCi/g	105	87 - 116	
Cesium-137	28.2	27.75		2.98	0.0700	0.124	pCi/g	99	87 - 120	
Cobalt-60	12.7	12.26		1.30	0.200	0.0456	pCi/g	96	87 - 115	

Lab Sample ID: 160-30233-1 DU

Matrix: Solid

Analysis Batch: 388358

Client Sample ID: PE2-RSYB5-DC-S001

Prep Type: Total/NA

Prep Batch: 384135

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total		LOQ	DLC	Unit	RER	Limit
					Uncert. (2σ+/-)						
Actinium 228	0.814		0.5877		0.167		0.0229	pCi/g		0.60	1
Actinium-227	0.156	U	-0.1787	U	0.565		0.330	pCi/g		0.27	1
Bismuth-212	0.282	U	0.0000	U	0.270		0.450	pCi/g		0.17	1
Bismuth-214	0.695		0.4195		0.116		0.0398	pCi/g		0.93	1
Cesium-137	0.0232	U	0.005683	U	0.0549	0.0700	0.0298	pCi/g		0.14	1
Cobalt-60	0.0275	U	-0.03467	U	0.0781	0.200	0.0370	pCi/g		0.45	1
Lead-210	1.09	U	-0.5909	U	1.29		1.16	pCi/g		0.51	1
Lead-212	0.511		0.5369		0.110		0.0352	pCi/g		0.11	1
Lead-214	0.597		0.5072		0.110		0.0449	pCi/g		0.35	1
Potassium-40	10.8		11.16		1.77		0.242	pCi/g		0.09	1
Protactinium-231	0.958	U	0.0000	U	0.587		2.05	pCi/g		0.32	1
Radium-226	0.695		0.4195		0.116	0.700	0.0398	pCi/g		0.93	1
Radium-228	0.814		0.5877		0.167		0.0229	pCi/g		0.60	1
Thallium-208	0.195		0.2117		0.0592		0.0187	pCi/g		0.13	1
Thorium-228	0.511		0.5369		0.110		0.0352	pCi/g		0.11	1
Thorium-232	0.814		0.5877		0.167		0.0229	pCi/g		0.60	1
Thorium-234	-0.948	U	-0.1582	U	1.18		0.973	pCi/g		0.39	1
Uranium-235	-0.104	U	-0.1796	U	0.312		0.396	pCi/g		0.13	1
Uranium-238	-0.948	U	-0.1582	U	1.18		0.973	pCi/g		0.39	1

# QC Association Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Rad****Leach Batch: 383242**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30233-1	PE2-RSYB5-DC-S001	Total/NA	Solid	Dry and Grind	
160-30233-2	PE2-RSYB5-DC-S002	Total/NA	Solid	Dry and Grind	
160-30233-3	PE2-RSYB5-DC-S003	Total/NA	Solid	Dry and Grind	
160-30233-4	PE2-RSYB5-DC-S004	Total/NA	Solid	Dry and Grind	
160-30233-5	PE2-RSYB5-DC-S005	Total/NA	Solid	Dry and Grind	
160-30233-6	PE2-RSYB5-DC-S006	Total/NA	Solid	Dry and Grind	
160-30233-7	PE2-RSYB5-DC-S007	Total/NA	Solid	Dry and Grind	
160-30233-8	PE2-RSYB5-DC-S008	Total/NA	Solid	Dry and Grind	
160-30233-9	PE2-RSYB5-DC-S009	Total/NA	Solid	Dry and Grind	
160-30233-10	PE2-RSYB5-DC-S010	Total/NA	Solid	Dry and Grind	
160-30233-11	PE2-RSYB5-DC-S011	Total/NA	Solid	Dry and Grind	
160-30233-12	PE2-RSYB5-DC-S012	Total/NA	Solid	Dry and Grind	
160-30233-13	PE2-RSYB5-DC-S013	Total/NA	Solid	Dry and Grind	
160-30233-14	PE2-RSYB5-DC-S014	Total/NA	Solid	Dry and Grind	
160-30233-15	PE2-RSYB5-DC-S015	Total/NA	Solid	Dry and Grind	
160-30233-16	PE2-RSYB5-DC-S016	Total/NA	Solid	Dry and Grind	
160-30233-17	PE2-RSYB5-DC-S017	Total/NA	Solid	Dry and Grind	
160-30233-18	PE2-RSYB5-DC-S018	Total/NA	Solid	Dry and Grind	
160-30233-1 DU	PE2-RSYB5-DC-S001	Total/NA	Solid	Dry and Grind	

**Prep Batch: 384135**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30233-1	PE2-RSYB5-DC-S001	Total/NA	Solid	Fill_Geo-21	383242
160-30233-2	PE2-RSYB5-DC-S002	Total/NA	Solid	Fill_Geo-21	383242
160-30233-3	PE2-RSYB5-DC-S003	Total/NA	Solid	Fill_Geo-21	383242
160-30233-4	PE2-RSYB5-DC-S004	Total/NA	Solid	Fill_Geo-21	383242
160-30233-5	PE2-RSYB5-DC-S005	Total/NA	Solid	Fill_Geo-21	383242
160-30233-6	PE2-RSYB5-DC-S006	Total/NA	Solid	Fill_Geo-21	383242
160-30233-7	PE2-RSYB5-DC-S007	Total/NA	Solid	Fill_Geo-21	383242
160-30233-8	PE2-RSYB5-DC-S008	Total/NA	Solid	Fill_Geo-21	383242
160-30233-9	PE2-RSYB5-DC-S009	Total/NA	Solid	Fill_Geo-21	383242
160-30233-10	PE2-RSYB5-DC-S010	Total/NA	Solid	Fill_Geo-21	383242
160-30233-11	PE2-RSYB5-DC-S011	Total/NA	Solid	Fill_Geo-21	383242
160-30233-12	PE2-RSYB5-DC-S012	Total/NA	Solid	Fill_Geo-21	383242
160-30233-13	PE2-RSYB5-DC-S013	Total/NA	Solid	Fill_Geo-21	383242
160-30233-14	PE2-RSYB5-DC-S014	Total/NA	Solid	Fill_Geo-21	383242
160-30233-15	PE2-RSYB5-DC-S015	Total/NA	Solid	Fill_Geo-21	383242
160-30233-16	PE2-RSYB5-DC-S016	Total/NA	Solid	Fill_Geo-21	383242
160-30233-17	PE2-RSYB5-DC-S017	Total/NA	Solid	Fill_Geo-21	383242
160-30233-18	PE2-RSYB5-DC-S018	Total/NA	Solid	Fill_Geo-21	383242
MB 160-384135/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-384135/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-30233-1 DU	PE2-RSYB5-DC-S001	Total/NA	Solid	Fill_Geo-21	383242

**Prep Batch: 384836**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30233-1	PE2-RSYB5-DC-S001	Total/NA	Solid	DPS-0	
160-30233-11	PE2-RSYB5-DC-S011	Total/NA	Solid	DPS-0	
MB 160-384836/13-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-384836/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	

## Tracer/Carrier Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-2

**Method: 905.0 - Total Beta Strontium (GFPC)****Matrix: Solid****Prep Type: Total/NA****Percent Yield (Acceptance Limits)**

<b>Lab Sample ID</b>	<b>Client Sample ID</b>	<b>Sr Carrier (40-110)</b>										
160-30233-1	PE2-RSYB5-DC-S001	88.1										
160-30233-11	PE2-RSYB5-DC-S011	86.4										
LCS 160-384836/1-A	Lab Control Sample	86.7										
MB 160-384836/13-A	Method Blank	84.7										

**Tracer/Carrier Legend**

Sr Carrier = Sr Carrier

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# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis

13715 Rider Trail North

Earth City, MO 63045

Tel: (314)298-8566

TestAmerica Job ID: 160-30233-3

TestAmerica Sample Delivery Group: Recount Request

Client Project/Site: Hunters Point Naval Shipyard - Parcel E2

For:

Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Eddie Kalombo

*Rhonda Ridenhower*)

---

Authorized for release by:

9/14/2018 3:54:58 PM

Rhonda Ridenhower, Manager of Project Management  
(314)298-8566

[rhonda.ridenhower@testamericainc.com](mailto:rhonda.ridenhower@testamericainc.com)

### LINKS

Review your project  
results through

TotalAccess

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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## Case Narrative

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-3

SDG: Recount Request

**Job ID: 160-30233-3**

**Laboratory: TestAmerica St. Louis**

Narrative

### CASE NARRATIVE

**Client: Aptim Federal Services LLC**

**Project: Hunters Point Naval Shipyard - Parcel E2**

**Report Number: 160-30233-3**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

#### **RECEIPT**

The samples were received on 08/17/2018; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 18.0 C. Client requested recount.

#### **RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)**

Sample PE2-RSYB5-DC-S004 (160-30233-4) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 08/17/2018, prepared on 08/20/2018 and analyzed on 09/13/2018.

## Case Narrative

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-3

SDG: Recount Request

### **Job ID: 160-30233-3 (Continued)**

#### **Laboratory: TestAmerica St. Louis (Continued)**

Sample was recounted and verified the 7-day count. Another recount was performed and confirmed this result.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# CHAIN OF CUSTODY

APTIM Federal Services, LLC  
4005 Port Chicago Hwy  
Concord, CA 94520

Project Number: 500506

CTO-013 RSYB5 Deconstruction

Systematic

Project Name:

Systematic

Project Location:

HPPNS - Parcel E-2

Purchase Order #:

202296

Shipment/Pickup Date:

8.16.18

Waybill Number: 126615451392166416

Lab Destination:

TestAmerica (St. Louis Lab)  
13715 Rider Trail North  
Earth City, MO 63045

Lab Contact Name / ph. #:

Rhonda Ridenhower (314) 298-8566

(Name & phone #)

Send Report To: Eddie Kalombo

Phone/Fax Number: 415-987-0760

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sampler's Name(s): Joaquin Ramirez

Sample ID Number	Sample Description	Date	Time	Method	Matrix	Preservative (soil)	Preservative (water)
					# of Containers	Container Type	
PE2-RSYB5-DC-S001	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1230	G	SO	1	16 oz. plastic jar
PE2-RSYB5-DC-S002	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1237	G	SO	1	16 oz. plastic jar
PE2-RSYB5-DC-S003	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1243	G	SO	1	16 oz. plastic jar
PE2-RSYB5-DC-S004	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1240	G	SO	1	16 oz. plastic jar
PE2-RSYB5-DC-S005	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1248	G	SO	1	16 oz. plastic jar
PE2-RSYB5-DC-S006	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1254	G	SO	1	16 oz. plastic jar
PE2-RSYB5-DC-S007	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1303	G	SO	1	16 oz. plastic jar
PE2-RSYB5-DC-S008	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1310	G	SO	1	16 oz. plastic jar
PE2-RSYB5-DC-S009	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1317	G	SO	1	16 oz. plastic jar
PE2-RSYB5-DC-S010	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1324	G	SO	1	16 oz. plastic jar

## Special Instructions:

Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g.

7 days ingrown draft and follow with 21 days final.

Level Of QC Required:

24-hr

3-day

10-day

II

III

Project Specific:

Relinquished By:  <i>Joaquin Ramirez</i>	Date: 8.16.18 Time: 1600	Received By:  <i>Kathleen Bo</i>	Date: 8.16.18 Time: 1600	Method Codes:  <i>Strontium</i>	Date: 8.16.18 Time: 1600	Matrix Codes:  <i>Dates</i>
Relinquished By:  <i>Eduardo</i>	Date: 8.16.18 Time: 1600	Received By:  <i>Kathleen Bo</i>	Date: 8.16.18 Time: 1600	Method Codes:  <i>Strontium</i>	Date: 8.16.18 Time: 1600	Matrix Codes:  <i>Dates</i>
Relinquished By:  <i>Eduardo</i>	Date: 8.16.18 Time: 1600	Received By:  <i>Kathleen Bo</i>	Date: 8.16.18 Time: 1600	Method Codes:  <i>Strontium</i>	Date: 8.16.18 Time: 1600	Matrix Codes:  <i>Dates</i>
Relinquished By:  <i>Eduardo</i>	Date: 8.16.18 Time: 1600	Received By:  <i>Kathleen Bo</i>	Date: 8.16.18 Time: 1600	Method Codes:  <i>Strontium</i>	Date: 8.16.18 Time: 1600	Matrix Codes:  <i>Dates</i>

160-30233 Chain of Custody  
Gamma Spec (EPA 191.1 M) -  
(7 day in-growth preliminary results and full 21 day in-growth for full gamma results)  
Total Strontium (EPA 905 M0D)  
Strontium 90 (EPA 905 M0D)  
Dose Rate  
μR/Hr

ABS=Asbestos, PC=Pipe Opening  
SL=Sludge  
CP=Chip Samples





APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520**CHAIN OF CUSTODY**

Ref. Document # PE2\_RSYB5\_DC#591

Page 2 of 2

Project Number: 500506

CTO-013 RSYB5 Deconstruction

Systematic

Project Name:

HPSNS - Parcel E\_2

Project Location:

Purchase Order #: 202296

Shipment/Pickup Date:

8.16.18

Waybill Number: 126645451312166746

Lab Destination:

TestAmerica (St. Louis Lab)

13715 Rider Trail North

Earth City, MO 63045

Lab Contact Name / ph. #: Rhonda Ridenhower (314) 298-8566

Preservative (water)

Collection Information

Date

Time

Method

Matrix

# of containers

Preservative (soil)

Container Type

N/A

Analyses Requested									
Total Strontium 90 (EPA 905 MOD)									
Gamma Strontium 90 (EPA 905 MOD)									
(7 day in-growth preliminary results and full 21 day in-growth for full gamma results)									
Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of containers	Preservative (soil)	Container Type	Preservative (water)
PE2-RSYB5-DC-S011	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1332	G	SO	1	16 oz. plastic jar	X	X
PE2-RSYB5-DC-S012	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1339	G	SO	1	16 oz. plastic jar	X	X
PE2-RSYB5-DC-S013	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1346	G	SO	1	16 oz. plastic jar	X	X
PE2-RSYB5-DC-S014	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1353	G	SO	1	16 oz. plastic jar	X	X
PE2-RSYB5-DC-S015	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1400	G	SO	1	16 oz. plastic jar	X	X
PE2-RSYB5-DC-S016	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1407	G	SO	1	16 oz. plastic jar	X	X
PE2-RSYB5-DC-S017	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1414	G	SO	1	16 oz. plastic jar	X	X
PE2-RSYB5-DC-S018	Parcel E-2 RSYB5 Deconstruction Systematic	8/14/18	1421	G	SO	1	16 oz. plastic jar	X	X
Special Instructions:									
Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g.									
7 days ingrown draft and follow with 21 days final.									
Level Of QC Required:									
<input type="checkbox"/> 24-hr									
<input type="checkbox"/> 3-day									
<input type="checkbox"/> 10-day									
<input type="checkbox"/> Project Specific:									
Relinquished By: <u>Eddie Kalombo</u> Received By: <u>Ronald Ridenhower</u> Date: 8.16.18 Time: 1:00C Date: 8.16.18 Time: 1:00C Method Codes: C = Composite G = Grab									
Relinquished By: <u>Ronald Ridenhower</u> Received By: <u>Nicholas Ridenhower</u> Date: 8-17-18 Time: 0830 Matrix Codes: DW = Drinking Water SO = Soil SL = Sludge CP = Chip Samples WW = Waste Water A = Air									
Relinquished By: <u>Ronald Ridenhower</u> Received By: <u>Ronald Ridenhower</u> Date: Time: Date: Time: Method Codes: C = Composite G = Grab									
Relinquished By: <u>Ronald Ridenhower</u> Received By: <u>Ronald Ridenhower</u> Date: Time: Date: Time: Method Codes: C = Composite G = Grab									

## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-30233-3

SDG Number: Recount Request

**Login Number: 30233****List Source: TestAmerica St. Louis****List Number: 1****Creator: Press, Nicholas B**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Definitions/Glossary

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-3  
 SDG: Recount Request

### **Qualifiers**

#### **Rad**

<b>Qualifier</b>	<b>Qualifier Description</b>
U	Undetected at the Limit of Detection.

### **Glossary**

#### **Abbreviation** **These commonly used abbreviations may or may not be present in this report.**

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## Method Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-3

SDG: Recount Request

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

**Protocol References:**

DOE = U.S. Department of Energy

None = None

**Laboratory References:**

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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## Sample Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-3

SDG: Recount Request

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-30233-4	PE2-RSYB5-DC-S004	Solid	08/14/18 12:40	08/17/18 08:30

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# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-3

SDG: Recount Request

**Client Sample ID: PE2-RSYB5-DC-S004****Lab Sample ID: 160-30233-4**

Matrix: Solid

Date Collected: 08/14/18 12:40

Date Received: 08/17/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
<b>Actinium 228</b>	<b>0.634</b>		0.260	0.268		0.0989	pCi/g	08/20/18 16:08	09/13/18 11:26	1
Actinium-227	0.239	U	0.479	0.480		0.317	pCi/g	08/20/18 16:08	09/13/18 11:26	1
<b>Bismuth-212</b>	<b>1.19</b>		0.606	0.618		0.207	pCi/g	08/20/18 16:08	09/13/18 11:26	1
<b>Bismuth-214</b>	<b>0.543</b>		0.133	0.144		0.0438	pCi/g	08/20/18 16:08	09/13/18 11:26	1
Cesium-137	-0.0499	U	0.0815	0.0817	0.0700	0.0600	pCi/g	08/20/18 16:08	09/13/18 11:26	1
Cobalt-60	-0.0325	U	0.102	0.102	0.200	0.0483	pCi/g	08/20/18 16:08	09/13/18 11:26	1
Lead-210	0.798	U	1.51	1.52		1.21	pCi/g	08/20/18 16:08	09/13/18 11:26	1
<b>Lead-212</b>	<b>0.739</b>		0.118	0.152		0.0555	pCi/g	08/20/18 16:08	09/13/18 11:26	1
<b>Lead-214</b>	<b>0.607</b>		0.118	0.134		0.0529	pCi/g	08/20/18 16:08	09/13/18 11:26	1
<b>Potassium-40</b>	<b>15.3</b>		1.89	2.45		0.258	pCi/g	08/20/18 16:08	09/13/18 11:26	1
Protactinium-231	0.0000000	U	3.10	3.10		2.55	pCi/g	08/20/18 16:08	09/13/18 11:26	1
	541									
<b>Radium-226</b>	<b>0.543</b>		0.133	0.144	0.700	0.0438	pCi/g	08/20/18 16:08	09/13/18 11:26	1
<b>Radium-228</b>	<b>0.634</b>		0.260	0.268		0.0989	pCi/g	08/20/18 16:08	09/13/18 11:26	1
<b>Thallium-208</b>	<b>0.273</b>		0.0824	0.0872		0.0313	pCi/g	08/20/18 16:08	09/13/18 11:26	1
<b>Thorium-228</b>	<b>0.739</b>		0.118	0.152		0.0555	pCi/g	08/20/18 16:08	09/13/18 11:26	1
<b>Thorium-232</b>	<b>0.634</b>		0.260	0.268		0.0989	pCi/g	08/20/18 16:08	09/13/18 11:26	1
Thorium-234	0.509	U	0.602	0.605		0.511	pCi/g	08/20/18 16:08	09/13/18 11:26	1
Uranium-235	-0.284	U	0.308	0.309		0.571	pCi/g	08/20/18 16:08	09/13/18 11:26	1
Uranium-238	0.509	U	0.602	0.605		0.511	pCi/g	08/20/18 16:08	09/13/18 11:26	1

## QC Association Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30233-3

SDG: Recount Request

### Rad

#### Leach Batch: 383242

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30233-4	PE2-RSYB5-DC-S004	Total/NA	Solid	Dry and Grind	

#### Prep Batch: 388849

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30233-4	PE2-RSYB5-DC-S004	Total/NA	Solid	Fill_Geo-21	383242

1

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